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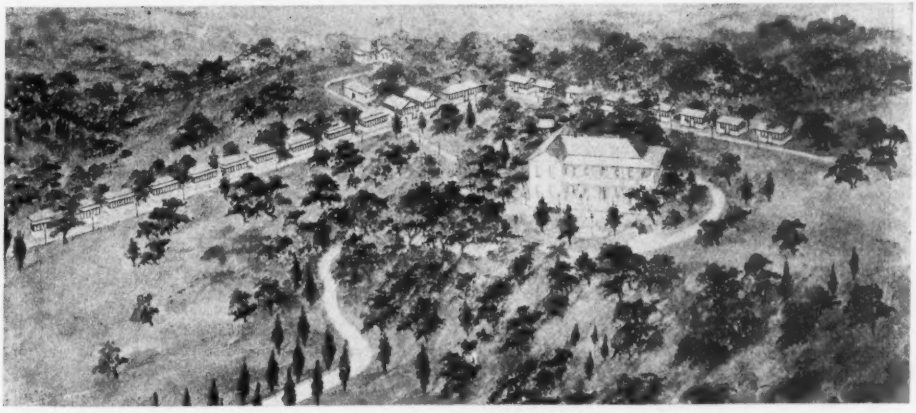

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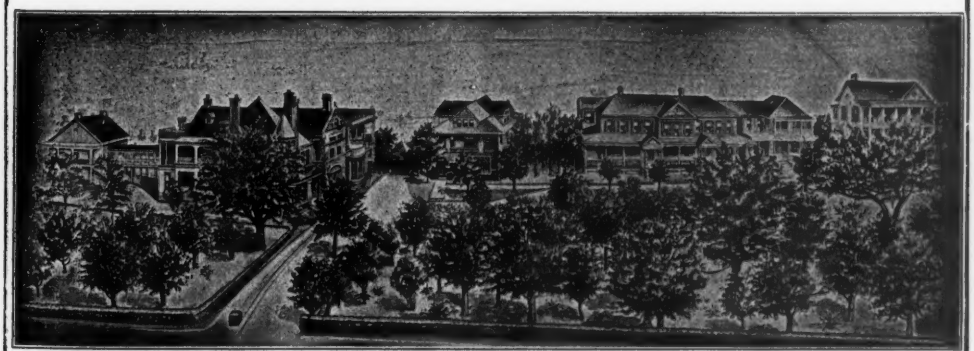

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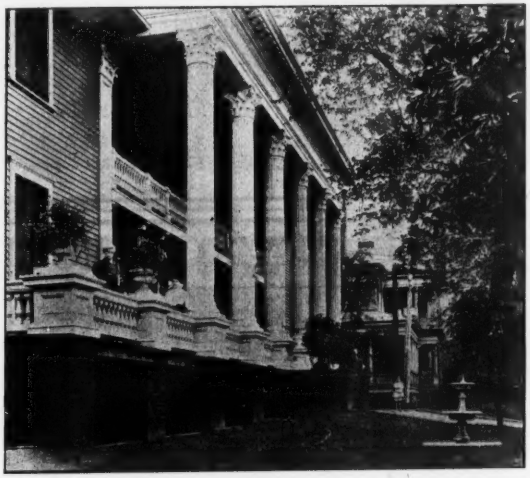

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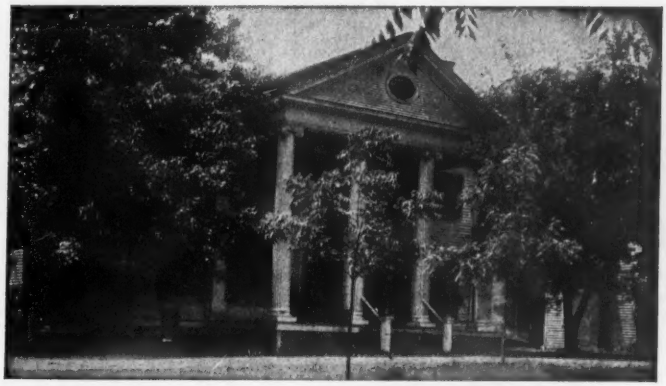

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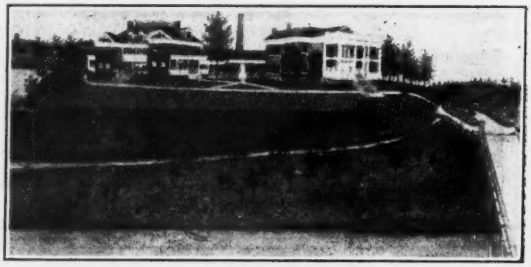

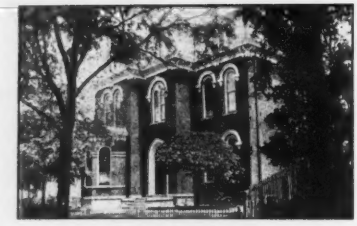

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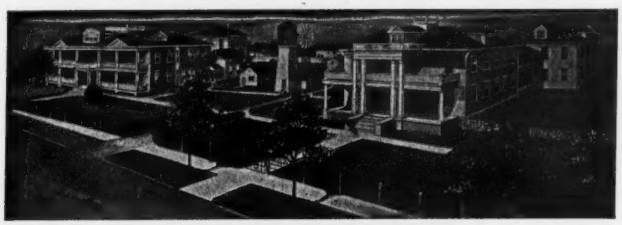

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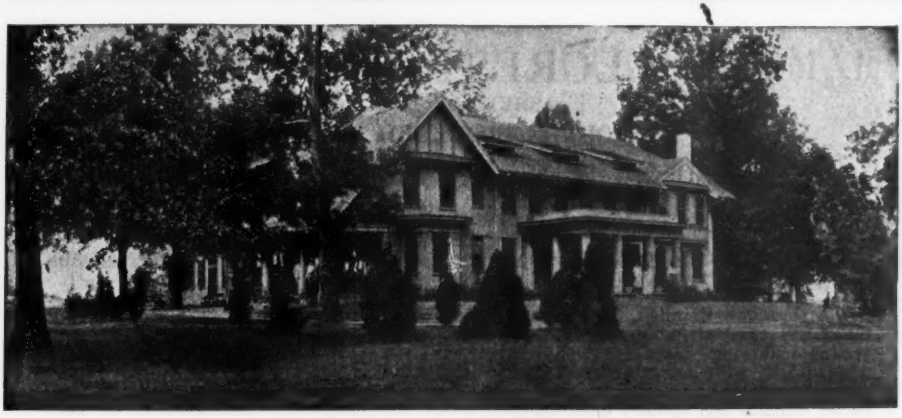

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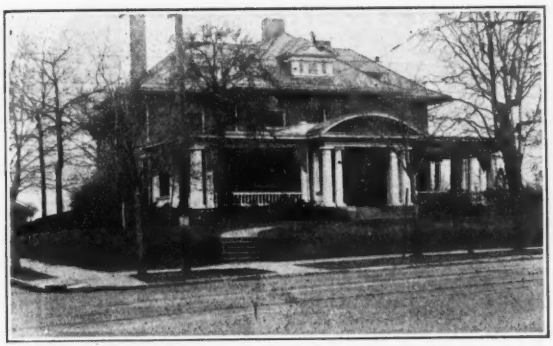

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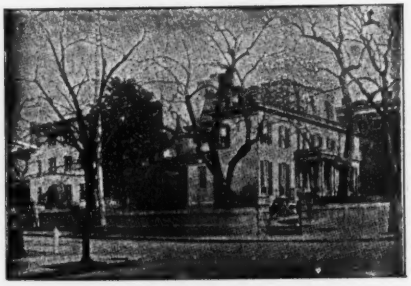

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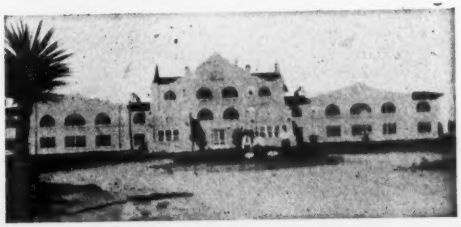

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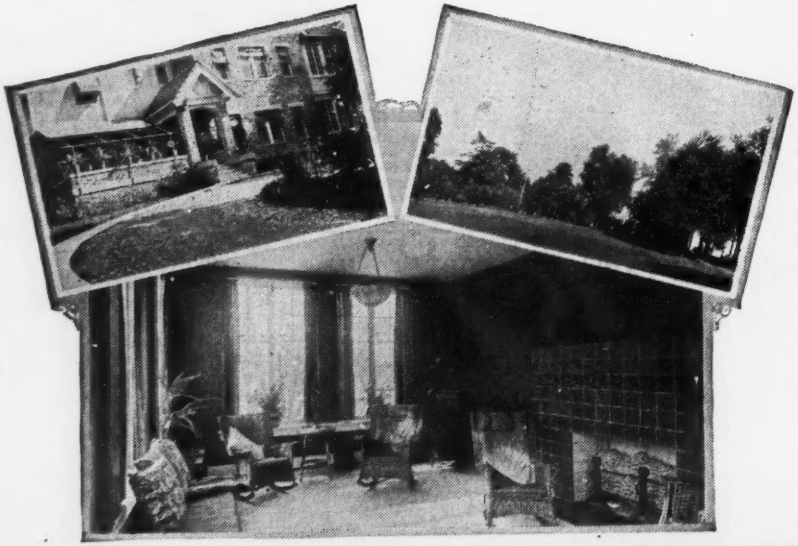

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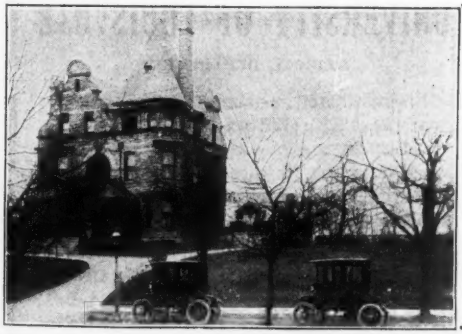

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MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

FOOD ALLERGY AS A CAUSE OF ABDOMINAL PAIN*

BY W. W. DUKE, M.D.,
Kansas City, Mo.

The phenomenon of hypersensitiveness has been gaining in interest and clinical importance since 1910, when Meltzer noticed the similarity between the bronchiole constriction of asthma and that found in animals dying in anaphylactic shock and suggested that real bronchial asthma was nothing more nor less than a phenomenon of anaphylaxis. Since this publication, a considerable number of clinical states have been mentioned which occur as a result of a hypersensitive state in humans which is now described under several terms, allergy, anaphylaxis and specific hypersensitiveness.

No symptom appears to the writer to be more interesting or important in this connection than severe abdominal pain. Abdominal pain is a serious symptom. It can never be taken lightly by a physician. It often indicates an emergency and often the necessity of surgery.

Many operations have been performed upon patients on account of the symptom, abdominal pain; and after the abdomen has been opened, no adequate cause for pain has been found. We believe that numerous cases of this sort are due to nothing more nor less than hypersensitiveness to a food or alimentary allergy.

*Read in Section on Medicine, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

The writer was first interested in this condition in 1913, since which time a relatively large number of typical and unmistakable cases have been observed. I wish to report here an outline of several cases and to describe the condition briefly.

Case 1.—Male, aged 32, with family and past history negative for hay-fever, asthma and other symptoms of allergy, had a severe illness at the age of 2, due to bee stings. He remembers that since earliest childhood he has invariably experienced a severe non-radiating gripping pain in the epigastrium, associated with nausea and vomiting, every time he has eaten honey. He has frequently tried to eat honey, but found that it invariably caused a severe attack of abdominal pain. The pain would start within fifteen minutes after the ingestion of honey and would last about three hours.

The patient has always been well otherwise. He has been free from other digestive disturbances and has never noticed other symptoms of allergy either during the attacks described or between attacks.

Physical examination was negative except for chronic ethmoiditis.

A cutaneous test made by applying honey to a scarified area on the skin gave a typical urticarial wheal about 2 cm. in diameter, which appeared in less than five minutes and disappeared after about one-half hour. The patient was unwilling to eat honey as a clinical test or to allow a small amount to be injected subcutaneously.

Case 2.—A male, aged 25, with family and past history negative for hay-fever, asthma, dermatoses and other symptoms of allergy, ate shad roe from two to five times a week at lunch for a period of several months. After removing to another locality, he did not eat shad roe for a period of about two years. He then became subject to occasional attacks of severe non-radiating, steady pain in the epigastrium which would develop about fifteen minutes after a meal and last from three to five hours. Occasionally the pain was associated with nausea and vomiting. The pain was so severe as to incapacitate him completely for

mental or physical work. Several attacks were followed by tenderness over the appendix, which lasted for about a week. The case was finally diagnosed recurrent appendicitis and the appendix was removed. A few adhesions about the appendix were found, together with several concretions in its lumen. Similar attacks of epigastric pain occurred after the appendix was removed. They differed from the former attacks only in the fact that they were not followed by tenderness in the right iliac fossa. Finally, it was discovered that the attacks occurred invariably after the eating of shad roe and that if the shad roe were eliminated from the diet entirely, no such attacks occurred. The patient had not at any time had hives, asthma or other symptoms of allergy.

This sensitiveness has now persisted for more than ten years, but is not so marked as it was originally. The ingestion of shad roe at the present time causes discomfort in the abdomen and nausea, but not severe pain.

Physical examination disclosed nothing of interest in this connection except a moderate grade of ptosis.

An intracutaneous injection made recently with an aqueous extract of shad roe gave rise to a cutaneous reaction about 0.5 cm. in diameter.

Case 3.—The patient was a female, aged 45. Her father had autumnal pollen asthma until his death several years previously. Her brother had summer and autumnal hay-fever and also eczema on the hands until he was forced to leave this climate.

The patient gave no history of hay-fever, asthma, eczema or other symptoms of allergy. Eight years before an abscess of the appendix formed and was drained. Five years before she had an infected gall-bladder, which was removed. One year after this, for the first time in her life, she began having indigestion, the outspoken symptom of which was a severe steady pain in the epigastrium, which came on almost every day about one-half hour after eating, and lasted from one to three hours. It was often associated with vomiting. She found by experience that the pain was relieved to a certain extent by lavage. The patient had been dieted and treated without relief for several months before coming under my observation. The history was otherwise negative or of no interest in this connection.

On examination there was found a slight grade of oral sepsis, slight general abdominal tenderness, high grade ptosis, adhesions about the pyloric end of the stomach very evident by roentgen-ray examination and a bulb deformity, due evidently to adhesions. Examination was otherwise negative or of no interest.

Careful dietary and intracutaneous tests proved the patient to be sensitive to lactalbumin, beef protein, and egg white. Tests made by applying the above proteins in dry powdered form to a scarified area on the skin were negative. However, intracutaneous injection of the proteins mentioned gave rise in a few moments to typical wheals about 0.5 cm. in diameter. Subcutaneous inoculations with small amounts of milk, egg white and beef serum, used subsequently in therapy, frequently gave rise to attacks of abdominal pain and vomiting similar to those of which the patient complained after eating eggs, milk or beef. The ingestion of a small amount of beef, milk and egg white, taken as a clinical test, in each instance gave rise to attacks of abdominal pain and vomiting, which came on within less than one-half hour and lasted from one to three hours. Other foods tested in this way caused little or no distress when she was on a diet free of egg, milk and beef proteins.

The patient was treated with subcutaneous inoculations of beef protein, milk and egg white (increasing from 0.001 to 1 mg.) over a period of two months. She did not at any time during this treatment have hives, asthma or other cutaneous or respiratory symptoms of allergy. A number of reactions, however, confined her to bed several hours with abdominal pain, vomiting, and general malaise.

At the end of two months her sensitiveness had been reduced to such an extent that she was tolerant of the small amounts of milk and eggs used in the cooking of ordinary foods, so that she has been able since treatment (now two years) to live in comfort on an ordinary diet when she simply avoids the drinking of considerable amounts of milk and the eating of eggs or beef.

Intracutaneous tests with lactalbumin, beef protein and egg white at the present time give definitely positive reactions.

Case 4.—A man, aged 44, with an uninteresting family and past history, began having dyspepsia and attacks of abdominal pain about six years before coming under observation. His dyspepsia had been practically unremittent during this entire period. He was subject to attacks of pain in the epigastrium, which would come on from two to four hours after eating, and last from six to thirty-six hours. At times the pain was so severe as completely to incapacitate him. He was subject also to dyspepsia, the symptoms consisting of discomfort in the epigastrium, sour eructations, bloating, and occasionally nausea, vomiting and diarrhea. He was subject to hives early in his illness. After these had persisted off and on for several months he discovered that he could keep himself relatively free of hives if he eliminated milk from his diet. Before coming under observation he had discovered that he felt better and had less abdominal pain and dyspepsia when he avoided both beef and milk.

The subsequent course of the disease disclosed three pathologic conditions of interest, namely, stone in the left ureter, gall-stones, and sensitiveness to milk and beef serum.

Intracutaneous tests with whole milk and beef serum gave rise to characteristic wheals about 1 cm. in diameter.

The patient was put on a diet free of milk and beef. While on this diet he seemed very comfortable. While on a beef and milk free diet he was able to eat without trouble such foods as green vegetables, condiments, nuts, etc., which had previously caused discomfort. He was finally given a meal containing a little rare meat as a test. He experienced pain after this meal, which started after about six hours, and lasted about

thirty-six hours. He refused to try further experiments of the sort.

The patient was then given a course of inoculations with beef serum and skimmed milk (from 0.001 to 1 mg.) over a period of six weeks. At the end of this time he was able to take small amounts of beef or milk by mouth without discomfort and without the appearance of hives. He was then put on a bland diet with gradually increasing quantities of milk, until finally he was able to take 1½ quarts daily without discomfort.

Fig. 1.—Positive cutaneous and intracutaneous tests. The two tests were made at the same time by applying honey (above) to a scarified area on the skin, and (below) by inoculating 0.02 mg. if honey intradermally. Both reactions appeared in less than four minutes, itched intensely and disappeared after about one and one-half hours.

Intracutaneous tests are now (two years later) still positive for lactalbumin and beef albumin.

The subsequent history of the case is of no interest in this connection. The kidney stone passed and the gall-stones were removed by operation.

I do not wish in this paper to discuss broadly the subject "allergy". I wish, rather, to confine my discussion and report to the concise fact that a reaction caused by hypersensitiveness to a food can give rise to severe abdominal pain, and that pain may be the prominent, and often the only, striking manifestation of the reaction. The abdominal symptoms of the reaction may be very violent and can easily be mistaken for those caused by a number of serious abdominal lesions.

Fig. 2.—Positive intracutaneous reaction (above) made by the intracutaneous injection of 0.02 mg. of lactalbumin. The test appeared in less than four minutes, and gave rise to an irregular wheal, which itched slightly and was replaced by a red edematous area of about the same size, which persisted for forty-eight hours. A cutaneous reaction (below) made at the same time by the application of powdered lactalbumin to a scarified area on the skin, with addition of a tenth normal solution of sodium hydroxid solution gave rise to no wheal whatever.

I have observed a number of patients who have been sensitive to one or more of

the following foods: egg white, egg yolk, shad roe, caviar, lactalbumin, casein, beef, pork, honey, strawberries, lettuce, almonds, beans, onions, cabbage, rice, potatoes, tomatoes, paprika and pimento, and who have invariably had an attack of severe abdominal pain whenever they ate the foods to which they were sensitive. In the majority of the cases pain appeared soon after ingestion of the food and lasted from three to six hours. In several cases, however, it did not appear for from three to twenty-four hours, and in these cases it lasted much longer. In a majority of the cases pain was associated with nausea and vomiting, less frequently with indigestion, bloating, diarrhea and mucous stools, and much less frequently with hives, angioneurotic edema, and purpura.

The pain complained of was evidently the result of a reaction caused by contact between the gastro-intestinal mucosa and the food product to which it was sensitive. This contact gave rise to gastro-intestinal symptoms in much the same way that contact between the mucous membrane of the respiratory tract and a pollen to which it is sensitive gives rise to symptoms of hay-fever or asthma. In other words, the pain and other gastro-intestinal symptoms described seem fundamentally analogous in pathogenesis to the symptoms of hay-fever and asthma.

An attack of asthma can be brought on in a sensitive individual by a subcutaneous injection of the pollen to which he is sensitive. Analogously to this, several of my patients had gastro-intestinal pain after subcutaneous injections of an extract of the food to which they were sensitive.

An experience of interest in this connection might be mentioned here showing that allergy, caused even by the injection of pollen extract in the treatment of hay-fever and asthma, can occasionally cause abdominal pain as part of a general reaction. A minority of patients who suffer from asthma and hay-fever complain of dyspeptic symptoms which appear at the beginning of the hay-fever season each year and disappear with the first frost. Occasionally, such a patient experiences abdominal pain in addition to the ordinary dyspeptic symptoms. One such patient, while under treatment with pollen extract, experienced abdominal pain after each inoculation of pollen, which was so severe that he refused treatment after the third inoculation on this account. The pain was severe, steady, non-radiating and localized in the epigastrium. It appeared a few minutes after each inoculation and lasted several hours. It was not accompanied by other symptoms of allergy. In fact, in this case it was the sole manifestation of reaction to the pollen.

It is interesting to mention that among the patients having food allergy observed by me, nearly 50 per cent had demonstrable pathologic lesions in the alimentary tract or its appendages. These lesions were recurrent appendicitis, gall-stones, duodenal ulcer, dense adhesions and extreme ptosis. Food allergy, like other forms of allergy, is, perhaps, primarily dependent upon an inherited constitution which renders the individual susceptible of becoming hypersensitive to alien substances. It seems quite possible, however, that an abnormality in the alimentary tract may be a contributing factor in the etiology of this type of case.

It is furthermore of interest to note the fact that in two cases attacks of acute appendicitis, which required surgical intervention, followed attacks of food allergy. While it is hardly justifiable to draw conclusions from two cases, it is justifiable to say that alimentary allergy is a very real cause of gastro-intestinal turmoil. It may cause violent muscular contractions, pathologic secretions, edema of the mucous membrane, and local anemia. It is very reasonable to suppose that this may occasionally set up infection and inflammation and give rise to serious disease in the alimentary tract or its appendages.

DIAGNOSIS

In the diagnosis of alimentary allergy as the cause of abdominal pain, the history of the case is all important. If a patient invariably has pain and other gastro-intestinal symptoms after eating certain articles of food, and is at other times free of digestive disturbances, the diagnosis is simple and easy. If, with this, there should be other manifestations of allergy, such as hives, angioneurotic edema or asthma, the diagnosis is comparatively certain. It can further be verified in the great majority

of cases by the use of intracutaneous tests with the suspected proteins. Skin tests in this particular type of allergy are not always so clearly positive as they are in hay-fever and asthma, but in the majority of cases characteristic wheals can be obtained if intracutaneous tests are made with the correct proteins.

In making a diagnosis of food allergy, it is not advisable to accept a patient's mere statement for the fact that the eating of a certain food invariably causes abdominal pain. Patients are often mistaken about this. It will often be found on putting them to a test and having them eat the suspected food that it causes no disturbance whatever.

When an individual is hypersensitive to an uncommon article of diet, such as shad roe or honey, the diagnosis of the condition is easy and is often made by the patient himself. He usually gives a history of occasional attacks of pain and vomiting, which last a few hours, and usually states that he is free of digestive disturbance at other times. When he is sensitive to a common food, such as eggs or milk, however, the diagnosis may be very difficult. Milk and eggs are used so commonly in cooking that a patient who is highly sensitive to either one may be in a reactive state almost constantly, and may have indigestion and pain almost every day. He may be unable to place the blame upon any particular food. The diagnosis may be doubly difficult because of the fact that the gastro-intestinal mucous membrane, when in a chronically reactive state, is often very irritable, with the result that rough or stimulating foods, such as coarse vegetables, fruits, nuts, condiments, alcohol, etc., irritate the stomach and augment the symptoms.

This is analogous to the fact that patients who have pollen asthma are made worse during the asthma season by dust, smoke and irritating vapors and are frequently led to believe that smoke, dust, etc., is the real cause of their discomfort. Thus patients having chronic alimentary allergy due to sensitiveness to a common article of diet, such as milk or eggs, are often inclined to place the blame upon rough foods, stimulating or irritating foods rather than upon the primary offenders, milk, eggs, wheat, etc., as the case may be. It is in cases of this type that cutaneous tests have their greatest sphere of usefulness. One can occasionally discover the offending protein by having the patient eliminate first one and then another common article of diet for a period of a week or more. By keeping careful notes he may be able to discover on which diet he is most comfortable and then by eating a suspected food determine whether or not it actually causes distress. This method of diagnosis may be very slow, however, and may even fail utterly should the patient be sensitive to two or more common articles of food.

Cutaneous Tests.—Cutaneous tests are not essential in the diagnosis of food allergy when an individual is sensitive to one unusual article of diet, such as honey or shad roe, and has pain soon after the eating of certain foods. In cases of this sort the diagnosis can usually be made without a cutaneous reaction. The great sphere of usefulness for cutaneous tests is for patients who are sensitive to a common article of diet, such as milk or eggs, or who are sensitive to several articles of diet, or for patients who have delayed reactions and experience no discomfort for a number of hours after the ingestion of a food. For the correct and prompt diagnosis of cases of this type, cutaneous tests are indispensable.

Several methods of making cutaneous tests are now being used. A method described by Walker is the simplest and most convenient. It consists of applying the suspected proteins in dry powdered form to a scarified area on the skin and placing on this a small drop of tenth normal sodium hydroxid solution. The appearance of a wheal indicates a positive reaction.

This method is very satisfactory in the majority of hay-fever and asthma cases. It failed utterly, however, in a number of cases of food allergy observed by the writer which gave very large wheals after intracutaneous tests. Intracutaneous tests have not been so convenient as the scarification method because of the fact that solutions must be used in the tests. Test solutions tend to lose their potency and it is quite difficult and laborious to keep a large number of potent solutions on hand. I have used a very simple means of making intra-

cutaneous tests. It can be carried out accurately without much trouble or expense, as follows:

Intracutaneous Method.—Place about 0.1 mg. of each of the suspected proteins (in dry powdered form) to be used in the tests upon a large sterile plate. One-tenth milligram of a powdered protein can be guessed at crudely as the amount of powder which can be taken up easily on the end centimeter of a Peerless round wood applicator. To each protein add 0.1 c. c. of physiologic sodium chlorid solution (distilled water will not dissolve globulin). Stir each carefully with separate wooden applicators until the proteins go into solution. Draw up the first solution to be used in a tuberculin syringe provided with a small needle and inject intracutaneously 0.02 c. c. (0.02 mg. of protein). Wash the syringe carefully in each of three separate vessels containing sterile physiologic sodium chlorid solution, numbered 1, 2, and 3. If care is used, the last washing should remove every trace of protein used in the previous test. The same syringe may then be used for the second test, and the same wash waters may be used several times, that is, if the vessels are always used in rotation according to their number, 1, 2, and 3. The method may be simplified when a large number of tests must be made by making preliminary tests with mixtures of several proteins (six to eight). If a mixture of proteins gives a negative test each constituent of the mixture can be eliminated in the final testing.

This method has several advantages: first, it is likely to give a larger number of definite positive reactions than scarification tests; second, dry proteins keep indefinitely; and third, it is simple.

The scarification and intracutaneous methods are compared in Figures 1 and 2. Figure 1 represents a patient on whom the two methods gave exactly the same result. Figure 2 represents a patient on whom a cutaneous test was practically negative, whereas an intracutaneous test gave rise immediately to a definite wheal.

In a normal person nothing striking follows an intracutaneous injection of a foreign protein. If an individual is inoculated with a protein to which he is sensitive, however, in a few moments a wheal will usually appear which varies in size from 0.5 to 2 cm. or more in diameter. The wheal is usually paler than the skin, usually shows pseudopod-like projections, is often surrounded by an irregular erythematous area, and often itches intensely. The wheal usually appears and reaches its maximum size within a few minutes. It may not reach its maximum for several hours, however. If it appears quickly, it usually disappears within one or two hours. If it reaches its maximum more slowly it usually lasts much longer.

Cutaneous tests are not so strikingly positive in the average case of food allergy as they are in patients who have hay-fever and asthma. In the pollen cases the scarification method is almost always adequate, and, as a rule, give rise to a large wheal within a few minutes if the correct pollen is used. In food cases, however, an intracutaneous test is very often necessary for a convincing reaction, and even this may fail occasionally.

TREATMENT

The treatment of food allergy may be considered from three points of view: first, removal of the cause; second, protein treatment; and third, symptomatic treatment.

Removal of the cause is very simple when a person is sensitive to a rare article of food, such as honey, shad roe, strawberries, beans or paprika. Nothing is easier than to instruct a patient to cease eating such articles and to live in comfort. When an individual is sensitive to a food used so commonly in cooking as eggs or milk, however, removal of the cause is by no means easy. Unfortunately, a person is often so highly sensitive that a mere trace of the food to which he is sensitive suffices to make him miserable. He may find it necessary to be constantly on the lookout to avoid taking such a trace unknowingly. For this reason, protein therapy in a case of this sort is advisable.

It must be mentioned here that in treating a case of this type it is not necessary to obtain complete desensitization in order to relieve the patient. Complete desensitization may not be possible, and an effort to attain this result may not be advisable or really very desirable. If a patient's sensitiveness is reduced to a point where he can tolerate the small amounts of the

food which are used in cooking other foods, he can, with a little care, live a life of comfort. For example, if a patient were sensitive to casein, and his sensitiveness were reduced to such a point that he could tolerate the amount of casein encountered in ordinary cooked foods, such as bread, cake, potatoes, etc., he could, by avoiding the drinking of milk and the eating of foods consisting chiefly of milk, live in comfort. It is not possible here to discuss broadly the subject of protein therapy. For this the many splendid articles already published should be consulted.

As symptomatic or temporary measures might be mentioned a bland diet, such as that used for hyperacidity, avoiding, of course, the proteins to which the patient is sensitive; sodium bicarbonate, in doses sufficient to reduce hyperacidity; atropin, and in the severer cases, removal of the exciting agent by gastric lavage and purgation and epinephrin or morphin subcutaneously, if needed.

SUMMARY

It is well known that humans and animals may become sensitive to alien bodies of many varieties. When this is the case, they react whenever they come in contact with the body to which they are sensitive. The gastro-intestinal mucosa may become hypersensitive to an article of food with the result that the patient experiences severe abdominal pain, often associated with nausea and vomiting, whenever he eats the food to which he is sensitive. These alimentary symptoms are in many cases the sole striking manifestations of the reaction. Individuals sensitive to uncommon articles of diet, such as shad roe, lettuce, honey, strawberries, cabbage, tomatoes, paprika, etc., usually give a history of occasional attacks of abdominal pain and digestive upset. They are, as a rule, free of digestive disturbance between attacks. Individuals sensitive to the commoner articles of food, such as milk or eggs, have more frequent attacks of pain and are often subject to chronic indigestion as well.

The symptoms of food allergy may stimulate somewhat those of a surgical lesion in the abdomen and an error in diagnosis may be made unless this condition is kept in mind.

Food allergy was observed more frequently in individuals who had organic lesions in the gastro-intestinal tract or its appendages than it was in normal persons.

Severe attacks of food allergy had acute appendicitis as a sequel in two cases and surgical intervention was required.

DISCUSSION

Dr. M. L. Graves, Galveston, Tex.—Perhaps it would be advisable in discussing this paper to draw attention to the difference between food allergy and anaphylaxis. Some years ago Cook divided hypersensitiveness into anaphylaxis and allergy. Dr. Robert A. Cook in the *Journal of the American Medical Association*, September, 1919, states that anaphylaxis is an antigen body reaction artificially induced by immunologic processes. Allergy is used to express natural hypersensitiveness of the individual not produced by immunologic processes as the exciting agents or allergens, or in many cases not capable of producing antibodies. Such natural hypersensitiveness is shown in response to the pollens. Natural hypersensitiveness to food or proteins known as allergy seems to be inherited, while anaphylaxis is a trait that is acquired. The former seems to have some relationship to the Mendelian law as a dominant characteristic. In the reference I made to Dr. Robert A. Cook's article, he also stated that symptoms of allergy are frequently gastro-intestinal manifestations with pain, vomiting and diarrhea. These reactions seem to depend in most cases upon the chemical molecule as a whole, and in a few cases upon some fraction of the molecule.

As far back as 1904, Victor C. Vaughan in the Harvey lecture outlined the symptoms of infection, such as fever, which might be produced by poisonous products of protein digestion. Gastro-intestinal disturbances dependent upon sensitization to eggs occurs in children, as has been stated by Talbot, and Schloss. H. L. Smith, I believe, in the *Archives of Internal Medicine* in 1909, was the first to draw attention to sensitization in the case of buckwheat poisoning. Longcope in the *American Journal of the Medical Sciences*, in 1916, points out that these gastro-intestinal symptoms occur after eating strawberries and melons, certain meats and shell fish. He further says that gastro-intestinal symptoms with pain are common in the spontaneously sensitized individuals from allergic reactions, while they are rare in the artificially sensitized from anaphylactic reactions. Longcope thinks the acute relapses accompanying some of these disturbances that are severe are caused by proteoses or such substances as histamin.

All of us, particularly those who live near the seacoast and see quite a large consumption of shell fish, find many cases of anaphylactic reactions in which the phenomena will be intense abdominal pain, nausea, vomiting, and sometimes severe attacks of diarrhea which will come on within a few to several hours after the ingestion

of food, and which are quite severe. I have at the present time a patient who has this sensitiveness not only to shell fish but to egg white and to strawberries. This patient was a few months ago tested out at the Mayo Clinic, and recently we find less sensitiveness due to the fact that she had restricted some of her food products as outlined by Dr. Duke in his paper.

The Doctor brings out another point which is interesting to me, and that is, he has not relied upon the cutaneous inoculation alone, but has made the intracutaneous injections. We have almost completely relied in our work upon the cutaneous reactions, fearing that the intradermal injections of so many of these proteins might produce a marked reaction which would mislead us in the diagnosis.

Dr. G. Canby Robinson, Baltimore, Md.—One interesting matter that I have observed particularly in one of these cases showing abdominal symptoms following certain articles of food is the very small amount of food necessary to produce the symptoms. In one boy, who was sensitive to egg, violent gastric symptoms followed the taking of a small piece of cake containing one or two eggs. He must have gotten a very small amount of the egg in the cake.

Dr. Warfield T. Longcope, who has studied the problem of allergy extensively, recently told me that he believed that patients are not in every instance sensitive to the food as they take it, but are sensitive to certain split products of the food during digestion. Then we are in a difficult situation as to treatment, as we are unable to tell what chemical product of food is responsible for the symptoms and from what food it comes. Longcope and Mackenzie have shown in an interesting way that allergy may be a localized affair. They produced protein reactions on the skin of sensitive persons, and have found that by reinoculation of the areas of reaction there was little or no effect within an hour or two after the first inoculation, while other points on the skin were sensitive, indicating that they had there a definite localized reaction in a certain group of cells which was not generalized in the skin. That may have some bearing upon this problem, because here we have a selective group of cells or selective tissue which seems to be sensitive to whatever it is that is causing the hypersensitive reaction or the allergic reaction.

I want to mention one case which is a little off the subject, but Dr. Duke's honey cases reminded me of it. I was walking with a group of people in the mountains of Pennsylvania when a young woman was stung on the head by a hornet. In two minutes she felt dizzy, and this was followed by swelling of the eyes, with redness and weakness, and an extraordinary red papular rash over her whole body. She had more or less difficulty in vision, and her pulse became weak and irregular. We were confronted with a severe general allergic reaction from the sting of the hornet. The other members of party stung were not so affected. It is well known that a bee sting or hornet sting may produce a generalized allergic reaction. This person had not been stung before but she had an extraordinary rapid, generalized allergic reaction which passed off in two or three hours.

Dr. I. S. Kahn, San Antonio, Texas.—In how many instances are the intracutaneous tests positive when the cutaneous tests are negative?

Does the use of soap and water or alcohol for cleansing the skin in any way modify or prevent positive reactions?

What is the usual time of the appearance of the cutaneous reactions and what is the longest time of delay possible before such positive reactions might occur?

Dr. Duke (closing).—I am glad Dr. Robinson brought out the point that an individual may be sensitive to digestive products of a food rather than to the food itself. I have felt for several years that patients who are sensitive to food and have delayed reactions (i. e., three to twenty-four hours after the ingestion of a food) must be sensitive to some product formed by digestion or putrefaction of the protein. This would account for the long period of incubation.

Concerning the relative frequency of positive reactions obtained by the cutaneous as compared with the intracutaneous tests mentioned by Dr. Kahn, I think one can say definitely that there are certain substances such as pollen extracts, horse dandruff, and honey to which a person can be sensitive, where the two methods give identical results. Patients sensitive to honey will give as great a reaction to the cutaneous as to the intracutaneous method. Patients sensitive to some substances such as lactalbumin or egg white may give negative cutaneous tests and very markedly positive intracutaneous reactions. I wish to add here that any skin reaction has to be taken with a grain of salt. Common sense and also a little guess work have to be used occasionally in making successful interpretations.

The time of appearance of a reaction varies from one minute to twenty-four hours. The delayed reactions can be accounted for if one assumes that the patient is sensitive to some split product of the protein.

THE X-RAY AS AN ADJUNCT IN DIAGNOSIS OF GASTRO-INTESTINAL DISEASES*

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We shall consider first whether there is a well-defined need for the x-ray in this department of medicine.

While the laboratory has been of inestimable value as a means for correct diagnosis of gastro-intestinal pathology it has

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only been able to furnish assistance in a limited number of cases and diseases. This, too, is true in a measure of the x-ray, yet I believe we are fully warranted in saying it is supplying a well-defined need. Much of the information obtained from the x-ray plate is not positive in its character, and every one making use of the x-ray should realize that it is only one of a number of agencies which should be used for this purpose, and the sum total rather than any single one used to arrive at a final diagnosis.

Some of the more common diseased conditions in which the x-ray may be of assistance are here considered.

Frequently in former days the doctor might be seen percussing the abdomen relying on the variation in the sound to give him information as to the location and character of the stomach or colon. As this paper is limited to the use of the x-ray in diagnosis no reference will be made to its value as a therapeutic agent.

The following is a case illustrating this condition. Miss C., white, age twenty-five, occupation, teacher of physical training. This patient was referred to me for treatment of a mild thyrotoxicosis. While taking the history of her case I found she was also having some distress in her stomach, the principal complaint being a heavy uncomfortable feeling after eating and a severe constipation. A barium meal was given, a fluoroscopic examination made and the stomach found so low, that it was resting upon the pubic bone. The fluoroscopic examination was made with the patient in the erect position but contrary to the general rule the ptosis was not relieved to any great extent in a recumbent position. The six-hour plate showed the stomach with about fifty per cent of the barium still retained, which of course explained the feeling of heaviness in the stomach and the discomfort for so long following the ingestion of food.

A barium enema administered later showed the transverse colon in a V-shape, packed down into the pelvis and apparently held there by dense adhesions, as massage under the fluoroscope did not return it to its normal position.

It is no exaggeration to say that nothing but the x-ray made this diagnosis possible except an exploratory laparotomy, which in this case would not have been permitted.

In the malformations and displacements of the large intestine held in their abnormal positions by adhesions the barium enemata are of untold benefit, the twist of one of the flexures with its usual accompanying filling defect give positive evidence of the trouble not easily obtained otherwise.

Even a diseased appendix may be visualized and found to retain the barium when other portions of the bowel have emptied themselves, and many use this as a positive proof of a chronic appendicitis. In my work I have had a few cases of this character, where operation later proved the correctness of the x-ray findings.

When we think of the x-ray and its use in the alimentary tract we naturally think of the diseases incident to the stomach of which, of course, the most common is ulcer. This alone would be sufficient for a paper and so we shall not be able in this short paper to do more than introduce the subject.

Ulcers are classified frequently as follows:

(1) Unperforated type of gastric ulcer.
  (a) An unhealed open cavity with no constriction.
  (b) Healed type without constriction.
  (c) Healed type with constriction.
(2) Perforated type, incomplete gastric ulcer.
(3) Duodenal type, ulcer unperforated.

As a general rule there is no need of the x-ray to diagnose a fully perforated gastric ulcer.

The x-ray must be looked upon in the light of an assistant rather than a positive agent, and so when we consider the first class of cases mentioned or those with an active ulcer with an excavation but unhealed, we must work hand in hand with the laboratory to secure the best results.

The chemical analysis of the stomach and fecal contents, the excess or lack of the proper amount of acids, especially hydrochloric, the presence of occult blood, must all be taken into account when the final diagnosis is made, but along with these should be the record of the fluoroscopic observations taken during the ingestion of, and immediately after the taking of the barium meal; these to be followed by a series of plates preferably not less than eight, of which six should be made at very short intervals, say ten seconds, to differentiate if necessary between

the peristaltic waves and possible contractions, the second plate 6 hours after the first, and later plates 24 hours and later if necessary.

These plates should be taken whenever possible in the upright position, the patient standing and leaning against the frame so as to remain perfectly motionless. If we do not do this we shall find ourselves embarrassed frequently as was the writer in his early work by finding on the plate an apparently empty pyloric portion of the stomach caused by the pressure of the spine as the stomach was pressed between it and the anterior abdominal wall. Fragmentary portions of the barium may be seen clinging to the walls, causing a typical picture of malignancy.

This practically is all disposed of when the picture is taken with the patient in the upright position.

With such a series of pictures as was described, one should be able to locate an ulcer of any considerable size by the depression made in the stomach wall, unless it happens to be on the anterior wall, when it may frequently escape observation.

In considering the second class of cases, or those having a healed cavity without contraction we must of necessity depend upon our own resources, for the fact that the ulcer has healed will usually mean that the secretions of the stomach will not be altered to any great extent.

First, we shall need to secure, if the internist referring the case has not already done so, a very carefully taken and complete history of the case, especially should this extend back several years. If severe periodic attacks are reported, especial attention should be paid to the season of the year when they recur as it is a well known fact that the attacks occur most frequently in the spring and fall. This fact will be all that we have to base an opinion upon unless there should be some pain.

In this condition we desire a patient with a stomach in which no food has been taken for at least eight hours. The early morning, then, is the best time for radiographic work to be done on the stomach. A mild cathartic should be given at night to free the intestinal tract from all its contents, thus giving the stomach freedom from any restraint that might come from a loaded colon.

The detail of this is similar to that already given, and does not need to be repeated. Our findings, of course, will be a cavity shown by the irregularity of the line shown by the stomach wall and an incisura in the opposite wall. Care must be taken, of course, not to confound this with normal peristalsis. While in the unhealed ulcer we may expect, and in experience do usually find, the peristalsis greatly increased, in the healed ulcer without constriction we find it more nearly normal.

In the healed type with constriction which usually will be found near the pyloric end or near the middle of the stomach we shall have more work to do.

If our constriction is just on the gastric side of the pylorus we shall find under the fluoroscope the peristalsis greatly increased; often times we shall not be able to visualize the duodenal cap or if we do, it will be very slow in forming. In this condition we must not be too hasty in forming our conclusions as we may simply have an abnormally slow peristaltic action instead of an obstruction. The series of plates, however, should make a final disposition of this. In the case of the hourglass stomach, while we may perhaps fail to give the correct cause as to whether it is a muscular spasm or an old scarred ulcer that is causing the trouble, we should not have any difficulty in making a correct diagnosis.

In considering the perforated type I shall take up only the incomplete or saddle type, for as I stated earlier in this paper, the complete perforated type is so evident usually as not to require the services of a radiologist. In the majority of cases, unless seen early it requires the services only of an undertaker.

The most frequent location for this trouble is on the lesser curvature on the gastric side of the pylorus. When located there it is not usually difficult to find, and owing to its peculiar shape a positive diagnosis can usually be made. If perchance the ulcer is on either the anterior or the posterior wall of the stomach we may have some difficulty and possibly may not be able to find it at all.

We shall consider duodenal ulcer from a radiological and not from an etiological standpoint. This possibly has been more frequently overlooked than any other form and its close proximity to the gall bladder may easily lead us to spend our efforts in a futile attempt to locate the elusive gall stone. If we take a reasonable amount of care we shall not usually make this mistake.

A number of years ago, before the x-ray was in common use, I was called to see a case diagnosed by my predecessor gall stones with severe recurrent attacks. I simply relieved her pain, for all operative procedure was refused. Later she drifted into other hands as these cases usually do, but several years subsequently I was called to see her just before she died. A post mortem was secured and a perfectly normal gall bladder was found with no stones. But the pylorus was completely closed from a benign scar, there being not the slightest evidence of a malignancy and the woman died of starvation. No food had been retained in the stomach for weeks. Today this would have been practically impossible, for even out in the smallest villages the profession and the laity are educated as to the value of radiology in these conditions and are seeking relief earlier. Many of them come direct to the radiologist for a diagnosis.

In this, as in the case of un unhealed gastric ulcer, the history obtained from the patient will greatly assist us.

The one radiological factor entering into our diagnosis here, is the time of the formation of the duodenal cap, and the speed with which the stomach empties itself. Always as has been mentioned before, we must watch for an atonic condition by which the peristaltic action is decreased rather than held back by an obstructed outlet.

Malignant conditions of the stomach and intestines call for our very best efforts, for if anything is to be done for those sufferers it must be done early. While the diagnosis of this condition is not so easily made as that of ulcer except in the well-advanced cases, yet we should be constantly on our guard and do our best with the x-ray to assist the internist in an early diagnosis. The barium meal with a liberal number of plates from all angles carefully studied should be our plan of procedure.

In carcinoma of the lower end of the esophagus because metastasis is much slower there, early diagnosis with massive radiation may afford temporary relief and make the patient more comfortable.

While the writer feels this to be a very elementary paper and one that possibly would be of more value if it were presented to a body of general practitioners than to a group of specialists, yet its repetition may do some good by refreshing our memories concerning these old familiar facts. Possibly through this we may reach the soil not so well cultivated, and thus the seed sown may spring up, and bear fruit in bringing earlier action in a larger number of cases, which is after all the only thing which will give us better results.

DISCUSSION

Dr. Charles L. Martin, Dallas, Tex.—The x-ray diagnosis of ptosis is one that is often of value, but I should like to call attention to the harm done in many cases where the patient is told that he has a "dropped stomach" or ptosis or whatever one wishes to call it. Many of these people worry about the position of their "dropped" organs and often become confirmed neurasthenics after being shown radiograms of them. Ptosis is more or less a normal state in certain individuals and need not interfere with the enjoyment of a fairly useful life, provided the patient is mentally normal and observes certain restrictions in his mode of living. We have examined several patients recently who have been given entirely too serious a point of view regarding the position of their viscera.

Dr. Clark stated that he made his gastric plates in the erect position. It has been our experience that the antrum and duodenal cap fill poorly in this position, particularly where the stomach is of the ptosic type. By placing the patient half on his right side with the right arm behind him and the left arm on his pillow, better filling results in a larger percentage of the plates taken. This position is also valuable in doing fluoroscopy since a gradual change from the prone to a lateral position is easily accomplished, thereby throwing the weight of the gastric contents against the sphincter.

Dr. Clark takes a history in connection with his gastro-intestinal work and so do I. To the roentgenologist who is trying to study disease intelligently, a history is of the greatest value. It might not be out of place to recall to your minds a statement made by Dr. Mills of St. Louis at the American Roentgen Ray meeting at Minneapolis. A roentgenologist, he said, should be a physician specializing in roentgenology. The real physician uses the material that passes through his hands for the purpose of study.

We should not be content to go ahead mechanically noting filling defects, abnormal peristalsis, etc., but should attempt to make observations upon patients whose barium meal examinations

are essentially negative in the light of what we now know, hoping to couple our observations with certain points in the history in a manner that may give them some significance. The material is in the hands of every roentgenologist who wishes to study his patient as well as his fluoroscopic screen and his plates.

Only recently Drs. Friedenwald and Finney of Baltimore described a syndrome closely resembling that produced by ulcer which they believed to be due solely to pylorospasm. A pyloroplasty often relieved the symptoms. The diagnostic evidence was derived for the most part from the barium meal examination which would not have been particularly interesting without the histories of the cases. Dr. Case and Dr. Mills, working separately, have been trying to find some significance in the configurations produced by the small intestine. This can only be done by studying the patient. All of us have the opportunity to add a new page to what we now know about gastro-intestinal disorders.

Dr. Robert H. Lafferty, Charlotte, N. C.—I am hoping that we may prevail upon Dr. Carman to tell us something of these obscure cases. When we see an ulcer situated on the lesser curvature it does not take much trouble to tell us what it is. But we have cases in which it is not so clear cut.

The ulcers on the lesser curvature which the surgeon cannot find when he goes in without opening the stomach, are the ones that annoy the roentgenologist. About three months ago a case came in which was clinically either an ulcer or a cancer. After going over the case very carefully from an x-ray standpoint, it was clearly evident that there was an ulcer slightly posterior on the lesser curvature. The patient then had quite a hemorrhage and it was decided to operate since it was difficult to determine whether it was an ulcer or malignancy. The only thing that the surgeon could find was what Dr. Cole, in Washington, called "the web in the attic," a mass of omental adhesions up in the region of the duodenum and lesser curvature. The surgeon, without opening the stomach, claimed that the whole gastric wall was very soft without induration or anything of that kind. As an x-ray man I am still sure that that patient has an ulcer, though the surgeon failed to find it.

A point which I hope Dr. VanderHoof, of Richmond, will bring out is the neurasthenic symptoms of ptosis. We should not tell a patient that she has a dropped stomach. It is as bad as telling a woman that she has a dropped kidney. We do not know where the stomach belongs. Suppose it is lying down where the uterus ought to be, especially if the patient has had a hysterectomy, it may still empty normally and consequently you cannot say that the ptosis is pathological. The stomach may be fastened down there and if there are no symptoms resulting you cannot call it a pathologic condition unless it interferes with the nerves. Dr. VanderHoof has done very excellent work on that subject.

Dr. Russell Carman, Rochester, Minn.—When I first began to do roentgenologic work at the Mayo Clinic, I felt that if I had the history I might bolster up the diagnosis to a considerable extent. I spoke to Dr. Mayo and he said he saw no reason why I should not have the history. We got the histories and found that in gastro-intestinal work they were of no value to us. Now, we do not care what the patient's history is. For instance, if we return a negative report, the doctor may say, "This patient has an excellent history of gastric or duodenal ulcer." To us it makes no difference. Our report is negative but we are very glad to re-examine the patient. I think you will find that the history is rather misleading in gastro-intestinal work. This does not hold true in chest, bone, genito-urinary work, etc. In these instances the history may be of value. There are so many complicating factors in gastro-intestinal work, such as spasm, fright, etc., that the history is of no value to the roentgenologist.

In regard to hour-glass stomach, we should endeavor to determine whether it is of intrinsic or extrinsic origin. To make this distinction we give the patient an antispasmodic such as belladonna, atropin or benzol benzoate, and re-examine him. If the hour glass is still present at the second examination we feel that it is caused by an intrinsic lesion, and that the surgeon will find the lesion if he looks for it. Some years ago, a noted surgeon asked me why the roentgenologist diagnosed so many hour-glass stomachs which were not found at operation. I told him that I thought the surgeon rather than the roentgenologist was at fault in many instances, because some hour-glass stomachs, even though of intrinsic origin, are relaxed by a general anesthetic and the causative lesion may not be discovered unless the stomach is opened.

The perforated gastric ulcers that we see are of two types: In one type, which the surgeon speaks of as the chronic perforative type, the ulcer has gone through the serosa but is sealed over by adhesions to the omentum or some adjacent organ. The x-ray man cannot differentiate this type from the ordinary ulcer which has not penetrated all the coats of the gastric wall. The second type perforates into an adjacent organ and produces an accessory pocket which is visible by x-ray.

Several years ago, while in St. Louis, Dr. Mills and I did considerable work upon ptosis which he afterward published. It was our conclusion that in the diagnosis of this condition the habitus of the individual should be taken into account and that a low position of the viscera may correspond to an asthenic habitus and, in a sense, be normal for that person. If the position of the viscera were always considered in relation to the general build of the patient, I feel that the diagnosis of "ptosis" would be made less frequently.

Dr. Clark (closing).—I purposely left out a discussion of neurasthenia. But I think this ought to bring home to us one point: no information should be given directly by the x-ray man to the patient. When the patient is referred by the internist to the x-ray man the information should go back to the internist. Let him fight out this question to suit himself.

The question of ptosis that has been mentioned, I only brought up incidentally and spoke of in patients where we believe it is causing disturbance. Ptosis means nothing to us if it does not produce pathology. The fact that a stomach is resting upon the brim of the pelvis need not cause worry if it empties itself properly. A patient comes to us with some gastric disturbance and we find that the stomach does not empty itself. It is then a question of what is causing the disturbance and it is up to us to lend our aid in the attempt to make a proper diagnosis. We should inform the internist of that condition.

I fully agree with Dr. Carman as to the matter of history. I do not think we should rely upon it. I was interested while attending Dr. Blaine's clinics to find that he never reads the history of a case until he makes his own diagnosis. If he cannot make the diagnosis then he will take the history. Sometimes it agreed and sometimes it did not.

I did not make myself clear, probably, with regard to hour-glass stomach. I am very glad to hear what Dr. Carman has said because we all know there is an intrinsic and an extrinsic condition. The extrinsic is due to a nerve spasm and we can relieve that without the aid of a surgeon.

THE RATIONALE OF DIGESTIVE THERAPY*†

By Ernest H. Gaither, M.D.,
Baltimore, Md.

Because the medical profession of late years has been progressively leaning toward rule-of-thumb, mechanical, fadlike and spectacular methods in diagnosis and therapy, the writer deems this an opportune time to present his views relative to what he considers a rational procedure in the treatment of diseases of the digestive system. It seems indeed that we are greatly in need of a renaissance, wherein the medical student and the practitioner will be taught the philosophy of medicine, enabling them to think along rational and independent lines based on the relatively solid and fundamental principles of anatomy, physiology, histology, pathology, materia medica and therapeutics. Further, the medical man has been far too prone to accept as true the many new and high sounding theories advanced in late years. If he will bring a saner judgment to his reading, weighing and considering, selecting the grain of truth from the great mass of chaff—he will have before him endless possibilities for achievement, not only in the broad field of treatment, but also in diagnosis.

Some years ago one would have hesitated to suggest to the medical man his need for earnest study of the basics (anatomy, physiology, histology, pathology, materia medica, therapeutics) in medicine, fearing his resentment of our apparent lack of respect for his learning. At this time the writer offers no apology for emphatically stating that the medical profession as a whole needs a thorough grounding in the branches just enumerated.

DIET

In the treatment of digestive disease, diet is of paramount importance. Unfortunately many medical men, believing the subject to be vast and formidable, have evaded the study of what is really a simple and easily understood method of treatment. The dietitian must be thoroughly versed in the following fundamentals: the physiology of digestion (the mechanical factors being of great import); the elements comprising all articles of food and their relative percentages of proteins, fats, carbohydrates, vitamines, water, salts; the tissue-formers; proteins, mineral matter, water; work and heat-producers, which are carbohydrates and fats principally. The caloric value of food must be known, always bearing in mind, however, that a well balanced diet is the desideratum: a diet containing the proper proportion of vitamines rather than a mass of food of specified number of calories.

Physical, chemical and thermic properties of food must be known. Liquids are either (1) bland (non-irritating) as milk (raw or modified), solution of egg albumin, whey, cream, buttermilk, cocoa, cream soups, asparagus, celery, pea, etc., liquid carbohydrates; or (2) stimulating, as beef extracts, beef juice, bouillon, broths, coffee, tea, fruit juice.

In a sparing diet we eliminate the irritants. These are:

*From the Digestive Clinic of the Johns Hopkins Hospital.

†Read in Section on Medicine, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

I. *Mechanical,* coarse vegetables and bread, meats, raw fruits, nuts.

II. *Chemical,* highly seasoned foods, condiments, alcohol, extremely acid fruits.

III. *Thermic,* extremes in heat and cold.

Soft Foods.—These consist of cereals such as cream of wheat and farina, purees of green vegetables and fruits—macaroni, spaghetti, rice. Eggs prepared soft, the pulp of orange or grape fruit, butter, cream-cheese, blanc mange, custards, gelatin, ice cream.

Solids.—Poultry, fish, game, meat, vegetables, fruits, breads, salads. Although a general diet may be indicated it is advisable in certain cases to modify the character of various articles of diet as in the case of chicken, fish, poultry and meat. This may be accomplished by mincing, shredding, scraping and chopping, and the vegetables and fruits may be altered by cooking and passing through a food chopper or sieve.

The coarse stimulating foods as vegetables, whole grain bread, fruits and salads are termed "roughage" and are extremely valuable in atonic sluggish conditions. Such a diet is contra-indicated in all inflammatory (particularly acute) irritative or ulcerative lesions. It is a safe rule to withhold meat, as the last article of diet to be prescribed, because of its great tendency to irritate a susceptible stomach or intestine. The action of coarse vegetables and raw fruits must also be closely watched.

Whether or not milk may be classed as a liquid food is a question which always precipitates discussion. Personal experience leads me to conclude that in a certain percentage of cases it does not act as such. On the other hand one cannot deny that the great majority of stomachs and intestines digest this food exceptionally well. In very acute inflammations of the stomach and intestine I prefer to withhold milk in the initial stage of feeding.

It is worthy of note that idiosyncrasy plays an important role in dietetics and that different patients, with or without identical lesions, will react quite differently to the same food. Further, the personal tastes of the patient should be respected whenever possible. When certain articles of food disagree it is not always necessary to withdraw them. They may be diminished in amount or prepared in a different manner. For example, raw fruits, vegetables and other foods may be cooked, pureed or creamed, while meats may be scraped, minced or chopped. Variation in diet is of fundamental importance.

Often a patient who presents every indication for a soft diet will lose appetite and reject the food offered, but will show immediate improvement when a diet agreeable to his wishes, in a form theoretically contra-indicated, is prescribed. This is also an important point to remember in relation to drug therapy.

DRUGS

As we acquire knowledge of its physiology and pathology, we lose enthusiasm for administering drugs in diseases of the digestive tract. The writer has found the following of greatest value:

Anti-Spasmodics.—In this group we have found belladonna to be the most valuable and dependable, and our preference is for the tincture, for in this form we are able to control the dose with accuracy and ease. The extract of belladonna and atropin sulphate are also applicable. Our experience with benzyl benzoate has been in the main disappointing.

Alkalis.—Bismuth subcarbonate and sodium bicarbonate have given us the best results in the use of this class of drugs, although we very often combine with them or use separately calcined magnesia, calcium carbonate, magnesium oxide, and magnesium hydroxide.

Astringents.—Tannic acid derivatives, and silver nitrate have proven of most value.

Sedatives.—Various combinations of bromides, hyoscyamus and belladonna have proven especially efficacious in a large percentage of our cases. Other drugs to be mentioned in this group are veronal (and other preparations of this class), Schlesinger's solution, pantopon, codein, morphin, silver nitrate, argyrol, carbolic acid, belladonna, benzyl-benzoate. Local heat or cold often proves most useful.

Laxatives.—Calcined magnesia, milk of magnesia, senna, cascara sagrada, phenolphthalein, calomel, rhubarb, mineral oil, bran and agar, sodium phosphate (and like preparations) have been exceptionally satisfactory when mild purgation is desired; while castor oil, sodium or magnesium sulphate, aloes and podophyllin supply our needs when drastic remedies are needed. Enemas in various instances prove of great value.

Stimulants and Tonics.—We continue to use nux vomica and other bitters, also dilute hydrochloric acid, with a certain measure of success. Pituitrin and physostigmin may be mentioned. However, the latter is rarely used. Arsenic and iron we have found to be immeasurably more helpful when administered in hypodermic form. In upbuilding treatment they are unquestionably of the greatest value.

Anti-Hemorrhagics. — Personal experience leads us to place most confidence in morphin, atropin, the ice bag, and transfusion, if necessary. Other preparations widely used but upon which we do not place a great deal of dependence are horse serum, coagulen, thromboplastin and other similar preparations.

Medicated Enemas.—In the greater number of our cases we have used tannic acid, alum, argyrol, bichlorid of mercury, boric acid and similar preparations. In colitis, rectal installations of olive or cotton seed oil have been very helpful.

Although they are used by many physicians our experience has been that the action of the so-called "intestinal antiseptics" is profoundly disappointing.

HYGIENE

Hygiene, unquestionably one of the most important and valuable of all therapeutic agents is nevertheless disregarded by medical men in general and digestive men in particular.

Strict attention should be paid to oral hygiene and habits of eating (mastication, regularity of meals, selection of food), hours and character of work, time for recreation and method of using this period, the amount of exercise and its specific application to the needs of each individual; the practice of proper breathing, ventilation of living and sleeping rooms, body hygiene (bathing). It is of value to know that in certain types of cases where indulgence in active exercise cannot be carried out great benefit may be obtained by skillful massage (abdominal and general). Further, the principle of rest in acute inflammatory conditions and stimulation in chronic processes, is applied to advantage in diseases of the digestive system, as it is in pathologic conditions elsewhere in the body.

To present in detail the treatment of all digestive diseases at this time is manifestly impossible, so we shall apply in one digestive condition specifically, and several generally, the principles that have been described above. Acute inflammatory disease will serve our purpose. We shall, therefore, consider acute gastritis. First, the etiologic factor is sought and an endeavor to remove it is made. In most instances (exclusive of acute infectious diseases and poison) dietetic errors supply the cause. The method par excellence of evacuating the stomach contents is by thorough lavage.

Before applying treatment we must visualize the pathology of the organ or organs involved. In this instance one may note inflammation, redness, swelling, loss of function and if not distinct pain, marked discomfort.

DIETETICS

We know that with such a pathologic lesion absolute rest, in the strictest sense of the word, is demanded. Therefore, nothing should be given by mouth until subjective symptoms and objective signs, i. e., pain, discomfort, nausea, vomiting, fever, tachycardia, epigastric or abdominal tenderness or muscle spasm, have very markedly subsided or disappeared. Any practitioner who is studiously watching his case needs no rule of thumb text book to direct that feeding start at a certain stated time. The signs and symptoms are a mirror for the reflection of gastric pathology. When the moment for application of food arrives, how shall we proceed? Because we are dealing with a sensitive and easily disordered mucous membrane, we know that the first food must be bland, soothing, non-irritating and if possible nourishing (although nourishment does not play an important role in acute illnesses). Referring to the list of such ar-

ticles, we find strained egg albumen, whey, sweet fruit juices, clear broths, cereal waters and watery gruels, flavored with chocolate, coffee or vanilla, as splendid examples of the type of food indicated.

While in certain of these cases milk or milk products are well tolerated, it is the experience of the writer that foods devoid of residue are by far the most efficacious. It is highly important to remember that when such a diet is attempted, small doses of one or two ounces should be given, at fairly frequent intervals, depending upon the stomach's reaction. Water may be tried in sips, some patients responding best to hot, others to cool water, while still others find small pellets of ice quite gratifying.

The markedly acute symptoms having subsided, there must first be an increase in the amount of the material primarily applied, and not until this is satisfactorily digested do we add more substantial food. However, when that moment arrives we move up the scale in physical and chemical attributes. We may now administer soft cereals with light cream, eggs in soft form, macaroni and other articles of like character, puree of potato and green vegetables, cream and clear soups, twice baked bread or crisp crackers, crumbled and softened with broth or skimmed, parboiled milk, soft custard or gelatin dessert.

When no difficulty is encountered with the above foods recourse (very gradually) may be had to a full diet, with the admonition that meat is to be the last article added and then in the form of finely minced chicken or scraped beef, withholding the heavier meats until there can be no doubt that complete return to normal has taken place. If such a rationale is carried out there is no need to consider the number of hours, days or weeks consumed in the administration of certain classes of foods.

When considering medication one should recall the pathology: redness, swelling, loss of function, the latter usually associated with an absence or marked diminution of gastric secretion. Although at first glance one might consider the application of acid, we know that such a procedure is ill-advised.

In each case, after thorough lavage, the treatment should be expectant, and close contact must be kept with the patient either directly or through the nurse or family. Quite often a hypodermic of codein, pantopon or morphin with atropin will be all the medication needed, but if the irritability persists, then bland, soothing and protective drugs especially in the form of bismuth subcarbonate and sodium bicarbonate should be administered and the large doses (heaping teaspoonful) frequently repeated (every two hours) are much to be preferred. An occasional hypodermic of atropin to quiet the spasticity is often of greatest value. Bromid by bowel many times has a soothing effect.

Thirst is best overcome by soda-glucose-salt solution as small rectal instillations (200 c.c. every few hours) or as a continual drip. Later, when all signs and symptoms point toward a disappearance of the acute inflammation of the mucous membrane, at which time a certain sluggishness in digestion is often noted, small doses of acid and bitter tonics may be administered, but even then caution must be maintained. General upbuilding medication is best carried out in hypodermic form, using various combinations of iron, arsenic, strychnia, phosphorus and glycero-phosphates.

Bowel evacuation is accomplished by enemas and not purgatives, but if the latter are used in the absence of contra-indications, those of a mild nature, such as the bland preparations of magnesia, are indicated.

HYGIENE

There is no branch of medicine in which hygiene plays a more important role than in diseases of the digestive tract, and yet it is constantly neglected.

In acute conditions, it is always advisable, for obvious reasons to insist upon bodily rest, an abundance of fresh air and the presence in the room of an attendant, thus insuring quiet. Vigorous rubbing should not be applied, but gentle stroking with alcohol or cool water (exclusive of the site of involvement) will many times be gratefully received by the patient and prove of real value.

Close attention to the bedding as regards comfort and cleanliness is to be insisted upon and the patient should be

placed out of doors at the earliest moment. There should be a gradual and not sudden return to the daily routine.

The above principles of therapy (with a few minor changes in details) may be applied to all acute inflammatory conditions of the digestive tract, i. e., lesions of the esophagus, stomach, intestine (large and small); gall bladder, liver, appendix, pancreas. In attacking the problem of chronic conditions we make use of the same methods of reasoning as stated above, i. e., intensely study the pathology of the part, and then apply indicated principles of diet, medicine and hygiene.

It may not be amiss to outline briefly the character of upbuilding treatment we institute in our convalescent and chronic cases.

Dietetic.—An application of the principles enumerated above with greatest emphasis upon the foods being well balanced, nourishing and of the utmost variety. When the addition of weight is desired, interval and bedtime nourishment are given.

Hygiene.—Whether or not confined in bed, continually in the open, preferably sleeping out of doors. If confined to bed, massage, alcohol, olive oil or cocoa butter rubs. If up, well regulated exercises, A.M. and P.M., and in the atonics those exercises especially designated to develop and strengthen the abdominal muscles. Deep breathing exercises. When discharged, specific directions on "how to live."

It is of vital importance to institute during an illness a regime which will tend to continue the normal functioning of the various organs. We should not make the mistake of sparing an organ at the expense of the general bodily economy if it can possibly be avoided.

Medicinal.—Exclusive of the drug therapy mentioned above, our most encouraging results have beeen obtained by the use of various combinations of iron, arsenic and strychnia, given in the hypodermic form. My personal experience is not sufficient to permit me to venture an opinion as to the efficacy of the intravenous method of drug application.

Post operative digestive cases call for the exercise of the greatest discretion and closest attention, but unhappily they are, as a class, the most neglected with which we have to deal. Because a lesion has been eradicated is no reason to disregard well established principles in treating a damaged organ or organs involved primarily or secondarily. Yet surgeons frequently prolong the period of convalescence, and sometimes defeat the purpose of an operation, by permitting a gastro-intestinal patient to return quickly to a general, and often improper diet.

In the hands of certain investigators, lavage of the duodenum and drainage of the gall bladder by the newer methods seem to have been productive of good results, but their value in digestive therapy has not yet been conclusively established. In true digestive neurosis where an absence of organic change is proven, the best results are obtained by prescribing a well regulated, properly balanced general diet, psycho-therapy with hygienic, dietetic and medicinal principles applied symptomatically. To pamper the stomach in these cases is fatal from the standpoint of successful treatment, for after all, the prerequisite is the re-education and upbuilding of the asthenic, irritable nervous system.

There has been no attempt in this paper to delve into the treatment of every gastro-intestinal disease. We have endeavored to outline a rationale which, it is hoped, will prove helpful as well as stimulating in the treatment of digestive disease.

DISCUSSION

Dr. Seale Harris, Birmingham, Ala.—Oftentimes the rational treatment of stomach symptoms should be directed toward other organs of the body than the gastrointestinal tract. The most important thing in the management of these cases is to get a thorough anamnesis of the patient, to find out the cause for the troubles of which the patient complains; not only as to diet, but inquire into the patient's daily life, his home life and find out, for instance, how many hours of sleep he gets. A person who is getting only four or five hours of sleep is apt to have digestive disturbances, and when he gets sufficient rest his symptoms subside. The excessive use of coffee or of tobacco, the excessive use of alcohol, not so frequent now as formerly, and the other excesses should be inquired into. One should also go into the question of how many times a day the patient eats meat. Excessive meat eating is one of the great causes of digestive disturbances and of general disturbances referable to the digestive tract. One should inquire about eating excessive amounts

of sweets and how much drinking water a patient takes.

Recently a patient told me he was drinking from four to six glasses of water with each meal. That accounted for some of his stomach symptoms. In the anamnesis we should consider symptoms referable to every organ in the body; not only that, but in the physical examination of the patient we should examine every organ of the body thoroughly, and then perhaps send the patient to several specialists to study the conditions from their viewpoint. For instance, I find more and more patients with stricture of the ureters who have digestive disturbances and they get but very little relief until they are treated for that condition. The treatment should be directed to the patient as a whole more than to the stomach in functional digestive conditions. However, in the cases of acute gastritis, ulcer of the stomach, and a few other conditions in which there are demonstrable pathologic conditions, the treatment should be directed toward the stomach itself.

A most important thing in the management of digestive diseases is to teach the patient how to live. The doctor should look upon a patient as a teacher looks upon his pupil, as a person who knows very little of personal hygiene. The colleges have not taught that up to this time, and very few people have any real idea as to personal hygiene. The doctor has not time to go into all that with a patient; but there are a number of books on this subject, one on "How to Live," by Fisher, another by Mary Schwartz Rose on "Feeding the Family," that will give the average layman a workable knowledge of dietetics and nutrition.

As to drugs in the therapy of gastrointestinal diseases, I think the farther we get away from them the better results we shall get with our patients. However, certain drugs are helpful. Among the drugs I consider most useful are atropin or belladonna. In a number of cases of cardiospasm and pylorospasm in which an antispasmodic is indicated, belladonna gives the best results. It is also useful to decrease gastric secretion. The essayist mentioned a drug, nitrate of silver, which is found advised in every text-book on medicine, yet it is one that has done an immense amount of harm in a comparatively few cases possibly, but in all cases where argyrism results it is a tragedy. I recently had a patient, a lovely young woman, who had been given nitrate of silver and whose skin will be blue for the rest of her life as a result. Besides the ulcer was not cured. I am frank to say that I do not see the rationale of using nitrate of silver internally.

Dr. George M. Niles, Atlanta, Ga.—One point which both Dr. Gaither and Dr. Harris brought out was rather to discourage the use of meat as an article of diet in people with impaired digestion. Sometimes that is carried too far by many physicians. On general principles when a patient comes to them complaining they say, "Cut out all meats." Many of these patients may not have eaten meat for a long time. It has been prohibited and they do not know the reason why. Those who have studied the subject will realize that a tender broiled steak or tender broiled chicken or fish is as easy to digest as many another article of food.

Furthermore, the human system needs a certain amount of meat. It is an economical protein. It does its work with a minimum amount of effort on the digestive system. That principle was enunciated over two thousand years ago when St. Paul said, "Milk for babes and meat for strong men." Furthermore, a study of the history of the nations of the world will show you that the nations that have led the others in science, in art, in warfare, in literature, and in everything worth while have been great meat-eating nations, while the vegetarian nations have been their servitors. Look at England, America, Germany, France. They are meat-eating nations, and during the last forty years Japan has been a meat-eating nation. Look at Egypt, India and China. What do they stand for in our cosmos?

Dr. Gaither mentioned one therapeutic agent in his armamentarium which I have used for a number of years and that is bromids. The bromids, every one of them, even the bromid of strontium, are more or less hard on a delicate stomach, but I have succeeded in getting a sedative effect that I wanted with a combination of passiflora, sumbul and scutilaria that I give to these neurasthenics, and to easily upset individuals a grain of luminal every other night, and have gotten all the sedative effects I wanted. Of course, we want to teach patients how to live. Give them hygienic instruction. We want to give them encouragement and all that, but we are also going to give them some drugs, I assure you.

Dr. Gaither mentioned a number of well known and accepted agents in the drug line which I agree, but Dr. Harris says we should keep away from drugs. The time is far distant when we shall be able to treat even intelligent patients without giving any drugs to them.

Let me close with the words of a French physician who said, "Medicine sometimes cures; it often relieves; it *always* consoles."

Dr. D. C. Walt, Little Rock, Ark.—It may be that I have lost vitality from not eating meat, but I think not. My average weight for twenty years was 150 pounds, prior to using my reason instead of my appetite. The last twenty years my average weight has been about 170 pounds, height 6 feet, endurance equally good. It may be that the strong nations eat a great deal of meat. Still, their health might be better if they ate less. There are intelligent people who do not eat very much meat. I understand that the great Edison eats very little of the heavy concentrated foods.

We should reason deeper than the stomach when considering food values. All influences must be absorbed into the circulation before it produces good or harm. What is digested and absorbed from the alimentary tract does good or harm. Food in the stomach is no more in the body than in the closed mouth. It is only further down the tract. Gastrointestinal symptoms are expressions of a disturbed general condition and must be the result of auto-intoxication or combined with infection. A man well cared for each day will not have gastric ulcers. Cereals and meats, with eggs, supply the bulk

of the heavy foods for civilized people and must be the largest contributory cause for disease on account of the daily consumption in excess of what is needed. They should never be used excepting to effect or nothing else can be obtained.

I have not eaten more than a few pounds of meat in twenty years. Have not consumed more than two pounds of cereals or bread stuffs or eggs in five years. Have taken some purgative every day for twenty years, trying to do a little more good each day than harm. It is not natural to take purgatives? It is not natural to wear clothes, but the latter make the former necessary. Until we can measure the influence of food and be able to reason from cause to effect from day to day, we shall not reach the highest value of our work as doctors.

Every human being needs more care than any other animal every day and gets less from the point of supply and demand, waste and repair.

Dr. John A. Witherspoon, Nashville, Tenn.—Every individual is a law unto himself in dietetics. When you undertake to lay out any regime for an individual you must know his personal tendencies. You must study your case carefully and thoroughly, whether it be gastric ulcer or what not, and apply remedies and means to meet the individual peculiarities. Some men do well on meats, some on vegetables. In treating gastric disease, if you study the individual from the standpoint of his personal peculiarities, if you work the case out, not along the line of a regime worked out in some laboratory, but in the laboratory of that man's systemic demands, you will have little trouble.

I should like to emphasize thorough examinations with thorough history-taking in all stomach cases and the management adjusted to the case with consideration for the individual tendencies of each case, each one a law unto itself.

Dr. Douglas VanderHoof, Richmond, Va.—If I may do so, I would suggest that a better title for the paper that has just been presented would be "Drug and Diet Therapy in Digestive Disorders" rather than "Rational Therapy."

The essential point in the treatment of chronic or recurrent "indigestion" is the recognition of the fact that we are dealing with a symptom and not a disease. Rational treatment, therefore, consists of finding out the cause of the "indigestion" and then removing the cause, if possible. To illustrate:

Some years ago I saw a young woman who had been treated for four years for "indigestion." She had run the usual gamut of acids and alkalis, ferments and "digestives," and had tried out various modifications of the diet. At the time I saw her she presented the characteristic picture of pronounced hyperthyroidism, except that the eye signs were lacking. She died shortly afterward. Now, we know that gastrointestinal symptoms are quite common in toxic goiters. If the cause of this patient's "indigestion" had been properly recognized and treated her life might have been saved.

When we come to analyze the causes of chronic or recurring "indigestion" we have to consider the well known relationship of various pathological processes within the body to the gastrointestinal tract. Certain of these processes are found within the abdomen while others are remotely situated.

Several years ago, in making a statistical study of two thousand consecutive patients complaining of "indigestion," we tabulated the apparent causes of the patients' symptoms with rather interesting results. For instance, chronic appendicitis headed the list, being responsible for 22 per cent of the cases. The second most common cause was chronic cholecystitis, with an incidence of 11 per cent. Peptic ulcer and functional disturbances (vagotonia, etc.) each accounted for about 10 per cent of the cases. Malignant disease of the stomach and intestines accounted for approximately 3 per cent, and uncomplicated chronic gastritis (achylia gastrica) made up an additional 4 per cent. The remaining 40 per cent of the patients had gastrointestinal symptoms attributed to reflex disturbances and various other causes (e. g., nephritis, cardiac decompensation, pulmonary tuberculosis, eyestrain, chronic toxemias, etc.).

The rational treatment, may I reiterate, is based on the etiology of the process underlying the gastric or intestinal symptoms.

Dr. John M. Bell, St. Joseph, Mo.—The stomach is the alarm box of the whole body. Do not look for disease in the intestinal tract in more than 10 or 20 per cent of cases. Look elsewhere for reflected conditions.

Under the head of intestinal antiseptics I should include hydrochloric acid. A normal percentage in the stomach will destroy most forms of bacteria and prevent their reaching the intestine. Large doses, 10 or 15 drops of pure HCl, are particularly indicated in those indefinite gastrogenic diarrheas. Again, under this heading I should include fruit diet, from the fact of its starving out all but the acid forming bacteria, the friendly bacteria of the colon. The best stimulant for peristalsis is food, providing it be coarse enough to overcome any atonic state that may exist in the muscular coat.

Dr. Gaither (closing).—In reply to Dr. Harris relative to the use of silver nitrate, we have been very much impressed by a definite class of cases presenting symptoms indicative of an irritative, inflammatory or ulcerative lesion, in which diet, rest, belladonna, alkalis and other remedies have failed, but where upon the application of silver nitrate these symptoms have been alleviated. Because one or several patients present an idiosyncrasy toward a certain drug is no reason why it should be banished from our armamentarium.

The remarks of Dr. VanderHoof relate to the diagnosis of digestive disease and extrinsic factors manifesting themselves in digestive symptomatology. The paper read dealt exclusively with digestive therapy.

My idea in presenting this small contribution was to bring before you the fundamental importance of possessing a comprehensive knowledge of anatomy, physiology, pathology, materia medica and therapeutics, as well as a thorough understanding of medicine, in order that intelligent discrimination may be applied in each case. In other words, as Dr. Witherspoon said, each patient should be a law unto himself.

INTRA-CRANIAL HEMORRHAGE IN THE NEW-BORN: CASE REPORT*

By Eugene Rosamond, A.B., M.D.,
Memphis, Tenn.

More than 50 per cent of deaths in the new-born are caused by cerebral hemorrhages due to the hemorrhagic disease of infancy. Over half the new-born infants who now die could be saved by a routine determination of the coagulation time of the blood and by the administration of injections of whole blood or of serum to those who show delayed bleeding and prolonged clotting time.

Multiple hemorrhages into practically every portion of the body have been shown to occur in true hemorrhagic disease.

The classical symptoms of cerebral hemorrhage, bulging fontanel, spasticities, convulsions and respiratory and cardiac disturbances, may occur late in the disease or not at all. The majority of cases of cerebral hemorrhage develop insidiously. External bleeding may occur very late or may not occur at all.

Out of 17 cases of convulsions in the new-born seen by the writer in the past twelve months, 14 had delayed bleeding-clotting time and were in all probability due to cerebral hemorrhage.

Intra-cranial hemorrhage due to the hemorrhagic disease of infancy should be our provisional diagnosis and the bleeding-clotting time of the blood should be our first diagnostic test in all cases of convulsions in the new-born.

Fourteen cases of this condition seen by the writer in the past twelve months' time in a pediatric practice of moderate scope is an index of its frequency.

The following case history is a fair example of the clinical picture:

The mother of Baby B. was taken to the hospital in her home town at the beginning of labor, where it was found she had a contracted pelvis and a cæsarean operation was performed.

The child, a boy, weighed nine pounds and was normal in every respect until the second day, when he grew pale and restless and clutched desperately at his blanket on being lifted or moved. This uneasiness was soon followed by fine tremors and a peculiar piercing cry, and in a few hours by convulsions.

I saw the child the following midnight. The temperature was normal and the bowels had moved well from a dose of oil. The fontanel was only moderately tense, the muscles were spastic and the convulsions, which had continued with increasing severity, were alarming in the extreme. There was marked disturbance of both respiratory and cardiac function. There was no bleeding from the cord or mucous membranes, no occult blood in the stool, no petechial or purpuric spots. There was no occasion for trauma.

The watch-glass method of Rodda showed the coagulation time of the blood to be 19 minutes. The bleeding time was 12 minutes, though blood spots on the bedding showed the heel puncture had again bled from rubbing.

The father was not in the hospital and as we had no means of determining blood groups, 5 c. c. of hemoplastin were immediately injected into the longitudinal sinus and 5 c. c. given in the gluteal muscles. Seven hours later the clotting time was 9 minutes and the bleeding time 5.5 minutes. Twenty cubic centimeters of whole blood were given intramuscularly and 10 hours later the timing showed both clotting and bleeding time well within normal limits with the convulsions having ceased.

The baby made an uneventful recovery and is at present in perfect health.

No lumbar puncture was done in this case, as I believe this procedure of doubtful value except in selected cases. Blood cells in the fluid may be from the spinal veins, though a perfected technic lessens the chance of injury to these.

The points of interest in this case are the occurrence of an intra-cranial hemorrhage in a cæsarean baby, the absence of all external bleeding, the severity of the convulsions, their duration of 36 hours before efforts to stop the hemorrhage were made and the prompt cessation of the convulsions when the bleeding was stopped.

Thirteen other cases of intra-cranial hemorrhage seen in the past twelve months all responded promptly to blood therapy. Several did not get beyond the stage of pallor and restlessness, when the coagulation time was taken and the true condition discovered. Only six cases showed external bleeding. One was a true melena.

Since a routine determination of the blood coagulability would reduce the mortality of the new-born practically 50 per cent, and, furthermore, since it would probably prevent a large number of the cases we now see of birth palsies, it is well worth the extra time and care it would take to make this a universal, routine procedure.

The purpose of this report is to accentuate the diagnostic value of a simple test and of a simple therapeutic procedure, to accentuate the frequency of the condition and the importance of its early recognition by routine examination of the bleed-

*Presented in Case Report Session, Section on Pediatrics, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

ing-clotting time of the blood in every new-born, or at least in every sick new-born child.

Memphis Children's Clinic.

DISCUSSION

Dr. John Zahorsky, St. Louis, Mo.—I was surprised a little by some of the statements; for instance, that a large percentage of cerebral hemorrhage in the new-born is due to hemorrhagic disease. I did not think the percentage was so large. We can frequently control the hemorrhage due to trauma by blood injections. Of course, in a case of ruptured tentorium, injection of blood has little value. I agree as to the use of the lumbar puncture in selected cases. If there is a blood vessel bleeding it will stop after a certain pressure. If we remove the pressure by early puncture the bleeding will continue, so lumbar puncture in cerebral hemorrhage has to be used at a certain time. It strikes me that wherever there is any question of cerebral hemorrhage the blood coagulation time should be taken.

Dr. W. McKim Marriott, St. Louis, Mo.—There is some misconception as to the means by which the coagulability of the blood may be brought to normal. The injection of blood accomplishes the desired result, but the administration of calcium salts fails to affect blood coagulation unless the blood calcium is below normal. The blood calcium is not low in the condition under discussion and the administration of calcium salts will not increase the blood calcium when it is already normal nor will it affect coagulation.

Dr. S. E. Kernodle, Oklahoma City, Okla.—The use of mother's blood in hemorrhagic conditions of the new-born reminds me of a few cases that have occurred in our limited experience. We have never seen any disastrous results from the use of mother's blood in the first few days of the child's life.

I have never seen any good results from injection of blood into the muscles of the child. I should like to have Dr. Rosamond's ideas along the line of the injection of mother's blood.

Dr. Rosamond (closing.)—The consensus of opinion is that blood used under the skin and in the muscles has the same effect as it does when introduced into the longitudinal sinus, except for the time element. Injection of whole blood is proven therapy. I think I am right in saying that it has also been shown that the mother's blood should be grouped with the infant's blood if we expect to keep out of trouble. We might get by in the majority of cases.

In some cases we find that the infant's serum will coagulate the cells of the mother. I do not see why the use of a serum like anti-hemorrhagic serum is not to be preferred when it is put into the vein. Mother's blood seems to be the method of choice, but I use it only in the muscle. Intravenously I use only the serum. I went to see Dr. Rodda last summer and talked to him. They were using whole blood. It does not make any difference whose blood you use. If you use it under the skin you get results. You can use the blood of any donor. The reason we did not use whole blood was that this case occurred down in Eldorado, Ark., and the baby had been in convulsions for two days and two nights. The emergency was such as to indicate intravenous medication. Here I prefer serum on account of its small bulk and ease of handling. If I were going to use blood intravenously I should certainly type it.

AN APPARENTLY HOPELESS CASE OF POLYGLANDULAR DISTURBANCE WITH INFANTILE GENITALIA IN A BOY SEVENTEEN AND ONE-HALF YEARS: COMPLETE CURE AT TWENTY-ONE YEARS*

BY CHAS. E. BOYNTON, M.D.,
Atlanta, Ga.

I was in close touch with this boy from infancy up to his sixth or seventh year. Then I did not see much of him professionally until he was seventeen and one-half years old. At that time it was discovered that sexually he was entirely infantile.

Family History.—Unimportant. No marked endocrines.

Personal History.—A rather delicate child. At one year a severe ileo-colitis with very protracted recovery. Later rheumatism with "skin nodules," but no joint involvement. Severe diphtheria treated with antitoxin. Typhoid fever. Mumps with no orchitis. Severe measles at eleven years of age.

There was nothing to call attention to his condition except that he was small and not growing as he should. His characteristics were entirely masculine, raising bull dogs, expert horseback riding, jumping hurdles, etc. At sixteen years his family noticed that his attitude toward life was peculiar and had gradually become more intensified.

Examination.—Appearance very youthful, four to five years younger than his real age, seventeen and one-half years. Face round and smooth. Voice, no evidence of changing. Figure decidedly feminine in type with broad pelvis, rounded buttocks, round extremities with rounded knees. A moderate layer of fat over entire body.

Decided local obesity; mammary, lower abdominal, pubic, crest of ilium, buttocks and upper thigh.

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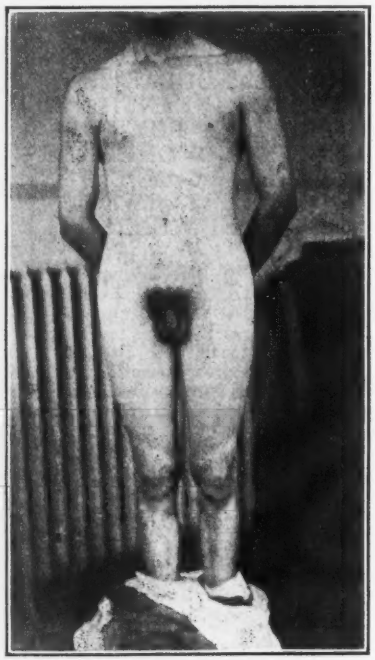
*Presented in Case Report Session, Section on Pediatrics, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

Skin: soft, velvety and showing diffuse erythematous mottling over most of body. Hands and feet looked cold.

Head hair: heavy suit, not dry.

Body hair: complete absence except for short fuzz on forearm and legs. No hair around nipples. Nipples undeveloped. No sign of axillary or pubic hair.

Genitals: penis one and one-half inches in length and half buried in overhanging pubic fat



Prepuce partially covers a very small glans. Scrotum outlined, pigmented, but no sagging down.

Testicles: both present but size of small peanut kernel. Vas and epididymis not palpable. Prostate barely perceptible. No erections or emissions. I have seen many boys one or two years old who were much better developed sexually.

He was put on anterior lobe pituitary and later on the whole gland, also didymin, thyroid and thymus tablets, two or three times daily for two-week periods alternately. The following June he was seen by two leading men in a Northern city. Both said he was too late, nothing could be done. The only hope was endocrine glands.

Dr. O. F. Elder, of Atlanta, then suggested that we try vacuum suction to penis, scrotum and testicles. This was done by Dr. Elder twice a week during the vacation periods of 1918, 1919 and 1920. Very little in the way of regular treatment, either local or glandular, has been done since January, 1921, as it did not seem necessary.

Improvement began soon after treatment was started and became more rapid after the vacuum was applied. By September, 1918, improvement in general, as well as sexually, was already noted. By the end of 1919 body changes were quite decided. The outline was much less feminine, hips less broad and buttocks flattened, the pubic pad much smaller and a patch of black curly hair one-half inch wide at base of penis. Penis three and one-half inches long, dilated, and glans two or three times original size. Scrotum, while still small, was beginning to hang and testicles size of small olives, firm and sensitive. He now had erections at intervals, but no emissions. Improvement in all directions continued steadily and live spermatozoa were demonstrated under the microscope in December, 1920.

Black hair appeared around the nipples and in axillae in April, 1921. The feminine type of arms and legs was about gone, elbows and knees were now angular and large veins showed on arms and legs. The pubic hair was now abundant and the triangle from pubes to umbilicus rapidly filling in. This is not shown in the picture. The penis dilated is six and one-quarter inches long, testicles are firm, sensitive and normal size. The emissions are normal. The vas, epididymis, seminal vesicles and prostate are normal, while the scrotum hangs sufficiently, as you can see from the photograph.

The x-ray shows the sella tursica normal and that the epiphyses correspond to those of a boy about eighteen years old. During the past six months his height has increased three-quarters of an inch, and apparently he is still growing. Voice and disposition have changed. Although no treatment has been used in about one year, the microscope showed last September that spermatozoa were abundant and very active.

48 Forrest Ave.

DISCUSSION

Dr. H. Leslie Moore, Dallas, Tex.—I have a case just the opposite in a seven-year-old boy. He has complete development of the genitalia, the genitalia being that of a man. His voice is coarse. I should like to know what the Doctor's treatment would be, whether he would reverse this suction treatment.

Dr. Boynton (closing).—I consider that the vacuum played an important part in the results obtained in this case.

Dr. Moore's case was probably due to a disturbance of pineal gland. I know of no treatment for this condition.

As pediatricians, we lose track of our patients as they grow up, and abnormalities of this kind remain undetected until it is too late to correct them in many cases.

Every boy and every girl should be watched during the developing period.

TROPICAL DISEASES AND PUBLIC HEALTH

CONTROL OF TYPHOID IN RURAL COMMUNITIES*

By Aleck P. Harrison, A.B., M.D.,
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State Board of Health,
Austin, Texas.

The history of a great disease should be of more vital interest and concern to mankind than the history of the great wars of men, when we consider the fact that a great disease claims far more victims throughout the ages than the combined wars of the world. The historical tale of a great disease contains deeds of heroism, of self-abnegation, of painstaking, concerted, earnest labor to discover the cause of the disease, its method of transmission and the means by which it may be combated, which makes it as interesting as any romance. In consideration of these facts, a very brief historical review of typhoid fever may not be out of place at this time.

One authoritative writer claims that "Typhoid is probably coeval with civilization and is easily recognized in the descriptions of Hippocrates (B.C. 460-357) and Galen (A.D. 130-200) and in more modern times in those of Andrianus Spigelius (1624)." Many famous names have been associated with the history of typhoid, but the writings and teachings of the great French physician Louis did most to disseminate a knowledge of the true nature of typhoid and it was he who gave its name to the disease. Louis' great work was published in 1829. William W. Gerhard and C. W. Pennock, of Philadelphia, and James Jackson, Jr., of Boston, brilliant young Americans, were numbered among the students of the great Louis, and upon returning to America, in 1836, Gerhard and Pennock studied the disease in the wards of the Philadelphia hospitals and contrasted it with an epidemic of typhus then prevalent in Philadelphia. These two observers were the first to point out the difference between the two diseases. This they did in the *American Journal of the Medical Sciences*, in 1837. Elisha Bartlett, in 1842, published the first systematic treatise which considered typhoid and typhus fevers separately, and with admirable clearness. To Eberth, in 1880, is usually ascribed the honor of discovering the Bacillus typhosus in the intestine of a patient suffering from typhoid. Koch and Gaffky also observed this bacillus in connection with typhoid about the same time.

Definite predisposing causes of typhoid fever have never been established, though certain peculiarities in its incidence have been noted. It would seem that new-comers to a locality are more likely to develop the disease than old residents, and this fact was commented upon by early French physicians in Paris. The physical condition of the individual attacked seems to have nothing to do with the development of the disease as healthy, robust people are attacked as often and as fiercely as the feeble and delicate. It may occur at any age and is unlimited in its distribution by climate, race, or civilization. It is chiefly a disease of adolescents and adults under thirty, but some writers claim the possibility of infection in utero, because successful cultures of Bacillus typhosus have been made from the fetus, and at the other extreme of life, a case at the age of ninety has been reported. Special epidemics may occur at any season, but the late summer and early fall is looked upon as the real typhoid period. Hot, dry summers seem more propitious for the disease than cool, wet ones. Lieberneister advances the theory to explain this observation, that during hot, dry summers there is a relatively larger quantity of solid matter in springs, "that the poison, in other words, is more concentrated and thus more virulent." As men are more frequently exposed to the disease, a larger number of men than women contract it. On the other hand, according to Barker,

"About four times as many women as men are typhoid carriers, the proportion being about

*Read in the Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

twelve to three, and these figures are interesting in connection with the fact that the same proportion exists in regard to gall-stones, which are present four times as often in women as in men. The human female, therefore, is largely responsible for the transmission of typhoid, as the female mosquito is responsible for the transmission of malaria. . . . I suppose there are some who will be unkind enough to look upon this as further proof that 'the female of the species is more deadly than the male.'"

In planning the control of typhoid, we must first of all consider the possible source of the disease, and it is just here that we note the difference between city typhoid and typhoid in the rural community. We are now well aware that the typhoid germ must be swallowed in order to produce the disease. Hence, whether we find the case in city, small town, or country, we start out to search for the origin with the examination of the things that go into the patient's mouth, the water, milk, food and sometimes ice. In the city these necessities of life usually come to a number of families from a common source, the city water supply, the dairy, the city market and the ice factory. Some of these sources of supply will undoubtedly be from outside of the city itself, which leads our search into the rural districts. We immediately recognize the fact that on account of these common supplies for numbers of people there is more danger of a widespread epidemic from a polluted supply in the city than in the country. In rural communities the families as a rule derive their water from an individual well or cistern on their premises, as there is usually no public supply; the exception being where numerous families obtain water from the same spring or flowing stream. The milk is often supplied by their own cows, the food is probably largely produced on the place and little or no ice is used.

So much for the infected sources of typhoid. And now a few words as to the mode of entrance of infection. The infection must come from the body discharges of an infected individual, most often the fecal discharge, but sometimes the urine, and rarely the sputum. Here again we contrast city and small town. In the modern city, we have a more or less complete sewerage system, and if the public water supply becomes infected we at once look for some break in the sewer lines or other connection between the sewage and water supply. In rural communities the greatest menace is the lack of a sewer system and the almost universal use of the insanitary, openback, death-distributing, surface privy. While the danger of an epidemic, once started, is greater in city than town, there is far more protection against its occurrence in the city than in the small town. The city has a water supply which is usually protected by filtration and bacterial examination, chlorination, and by ordinances prohibiting its pollution. It has obligatory examination of milk supplies, licensing of dairymen and probably pasteurization; inspection and regulation of food supplies and food handlers and regulation and inspection of the ice supplies. In addition to these protections, there is probably a well-organized health department consisting of whole-time, specially trained public health men whose duty it is to guard the health of the city. The rural community has individual water, milk and food supplies, unprotected, uninspected and unregulated, and usually exposed to the constant danger of pollution by direct seepage from the privy into the well or spring, or by contamination carried by flies from the privy to the water, milk or food. These facts prove to us that while the city dweller is only occasionally in danger of typhoid, the rural resident is constantly surrounded by the ever present menace of infection and if he has escaped, we can only say, the Lord has been merciful to him.

To work out the problem of control of typhoid in rural communities successfully, we must attack the disease at its sources: the patient suffering with typhoid and the privy disseminating it. This brings us up to the great fundamental in the success of all public health work, the proper education of the masses of the people in the cause, danger, care and treatment, and the entire possibility of eradicating the disease. The truth has been ofttimes expressed that "within reasonable limits any community can determine its own death rate." What will it profit us to stamp out one epidemic or a dozen, if we leave the people too ignorant to protect themselves, or too indifferent to care? The final so-

lution of the problem of rural control is education, combined with the practical demonstration of protective measures. This education is carried on by means of moving pictures, lectures, distribution of literature, newspaper articles, public exhibits at fairs and in other public places, health-mobiles and health cars; by school talks, personal advice and other methods too numerous to mention. But, you say, who is to do all of this in the country? And now you have propounded the most vital problem of modern health work, namely, the problem of supplying efficient, rural health organizations. The answer to the problem is the whole-time, trained, adequately paid county health officer and a small staff of assistants. When we have supplied such working units in our counties, we shall control typhoid in rural communities, together with hookworm and other soil pollution and preventable diseases.

So much has already been written on the actual control operations of a case or epidemic of typhoid, that it is scarcely worth while to attempt more than a brief resumé at this time. One author has said, "wipe out typhoid by killing the germs in the bed-pan," and this advice is very valuable. We should instruct each family in the proper method of disinfecting all body discharges before their final disposal. We should allow as few people as possible to be exposed to contact with the patient and those should be instructed in strict personal cleanliness, scrubbing and disinfecting their hands frequently and never putting their fingers in their mouths or handling any food until their hands have first been thoroughly cleansed. Strict antiseptic precautions should be used in handling and cleaning all articles that come in contact with the patient, bed clothing, eating and drinking utensils, etc. At the culmination of the disease, the room should receive a thorough scrubbing and disinfection and the sunlight be allowed access for several days before it is again occupied. If possible, the patient after apparent recovery should have several tests made of his stools and urine and a Widal on his blood to determine whether he is entirely free from the Bacillus typhosus, or whether he is a typhoid excretor or carrier, in other words, a typhoid host, which includes both carriers and excretors. Some eminent authors claim that the discovery and control of the typhoid host is by far the most important element in the eradication of the disease in a community. Fornet states that 55% of all cases of typhoid fever are transmitted by typhoid hosts, exclusive of many other cases in which the infective agent, conveyed by means of water, milk, or different kinds of food, is originally introduced into these media by carriers.

It is not nearly so difficult to discover the typhoid excretor as it is to discover the carrier, because the carrier only excretes the bacilli at times, in the urine and feces, and furthermore, he is a perfectly well individual who very probably knows nothing of his infection and resents examination. On the other hand, any one who has had typhoid or has come in contact with a patient is a possible excretor. Probably 70 to 75 per cent of the carriers show a positive Widal and examination of the feces and urine will discover more. Granted, now, the danger of the typhoid carrier, the question arises when we have discovered him, what are we going to do with him? It is obviously impossible to control him, as absolute control could only be exercised in an asylum for the insane or a prison. Many attempts have been made to solve the problem. Briefly, it is futile and unwise to attempt to control him by law. Efforts have been made to cure him by internal therapy, to immunize him by injections of typhoid bacilli and autogenous vaccine, all of which have proven unsatisfactory, and the consensus of opinion today is that the most efficient method of dealing with typhoid carriers is to prevent them from handling or distributing food, and to instruct them in measures of personal cleanliness necessary to prevent their being sources of infection, and further to appeal to their sense of fairness and right to protect others. Barker says,

> "Clean typhoid hosts are not dangerous to the community and carriers who are accustomed to taking special care of their bodies rarely give the disease to any one else."

Having treated the patient correctly and rendered inocuous the typhoid hosts,

so far as it is possible, we should eliminate all other possible sources of infection. The community should be notified of the location of existing cases of typhoid by placarding the houses. The direct source of infection of each case should be traced, if possible, to the privy whose contents seeps into the well, stream, or spring: the polluted milk or food, possibly the lettuce polluted with excreta or the oysters which have fed on sewage, or some other of the many possible sources of infection. During any epidemic of typhoid, a community should, on suspicion, boil or otherwise disinfect all drinking water and boil or pasteurize the milk. If we should give any one preventive measure the greatest value in rural communities, I am sure that we should all agree upon the banishment of the insanitary privy and its replacement by some of the many simple and effective toilets, until it becomes practicable to install a sewerage system.

A discussion of the control of typhoid in any locality, urban or rural, would not be complete without a mention of the splendid results that have been obtained by immunizing thousands upon thousands of people by prophylactic inoculation. We are all familiar with this procedure, which practically banished typhoid from our army during the world war when used coincidently with sanitary surroundings in the camps. During any typhoid epidemic as large a percentage of the population as possible should be immunized. It may be of interest to know that vaccination against typhoid fever originated in 1896 when Pfeiffer and Kolle of Germany demonstrated that persons injected with killed typhoid bacilli, develop the same antibodies in their blood as are found in recovered cases of typhoid fever. Wright shortly introduced it into the English Army and Major Russel, after thoroughly investigating the subject, elaborated for use in our Army a method combining the English and German methods. Typhoid vaccination was first begun voluntarily in the United States Army in 1909, and it was made compulsory in 1911.

SUMMARY

(1) Typhoid fever is one of the oldest diseases known to man. It is confined to man alone and not found in the lower animals.

(2) Its etiology and methods of transmission are thoroughly understood.

(3) Infection comes only from an infected individual ill with the disease, or a carrier, through infected water, milk or food. The infection must be swallowed.

(4) There is a constant source of infection in rural districts, the open-back privy, the open, unprotected wells, the unscreened houses being the chief sources of danger.

(5) Typhoid may be controlled and eradicated by educating the masses of people, educating the carriers, building sanitary privies, using pumps instead of open wells, screening the houses, properly treating patients and protecting all water, food and milk supplies and lastly by rendering a larger proportion of the population immune by vaccination.

In concluding this paper I wish to emphasize the great importance in typhoid control, and in all health work, of making a strong appeal to the common sense of the people to protect themselves against preventable diseases, and to illustrate such an appeal I close with a little poem by an author unknown to me, which impressed me greatly. This little poem is entitled:

THE BREED OF MEN

You talk of your breed of cattle
And plan for a higher strain,
You double the food of the pastures,
You heap up the measure of grain;
You draw on the wits of the Nation
To better the barn and the pen;
But what are you doing, my brothers,
To better the breed of men?

You boast of your Morgans and Herefords,
Of the worth of a calf or a colt,
And scoff at the scrub and mongrel,
As worthy of fool or a dolt;
You mention the points of your roadster,
With many a "Wherefore" and "When",
But, are you conning, my brothers
The worth of the children of men?

And what of your boy? Have you measured
His needs for the growing year?
Does your mark as his sire, in his features,
Mean less than your brand on a steer?
Thoroughbred—that is your watchword,
For stable and pasture and pen;
But what is your word for the homestead?
Answer, you breeders of men!

Discussion follows paper of Dr. Williams, page 685.

SOIL POLLUTION, A PUBLIC HEALTH PROBLEM OF TODAY*

By E. L. Bishop, M.D.,
Director Rural Sanitation, Tennessee State Board of Health,
Nashville, Tenn.

The sanitarian of the present day is inclined to minimize the importance of soil pollution with the one exception of pollution by human excrement. To him the earth is a living thing, manifesting as it does many of the attributes of life. It is capable of digestion and assimilation. It breathes and by reason of the oxidation of organic matter gives off carbon dioxid. Myriads of forms of life and countless millions of each form are contained in it and supported by it. Its individual grains are enclosed by a covering of living things. It is constantly undergoing metabolic change, being reproduced, disintegrated, and, in certain areas, dying for lack of water. In other areas its contained life is limited by an excess of water and it may in fact become so water-logged that its capacity to support life is destroyed. Like other living bodies it may suffer from an excess of food and its own excreta.

From the soil directly or indirectly is supported every living thing and to it ultimately must return all living things. The statement that "any permanent break in the nitrogen cycle would result in a cessation of all forms of life" is obviously true. The relation of the soil to life and to the production or prevention of disease is influenced by a number of factors. Perhaps the most important are its character, composition and configuration; the density and power of absorption; the contained oxygen and water; the number and types of bacteria; the extent and character of modification and interference with natural activity by sanitarians or would-be sanitarians.

Normally the soil is able to care for a vast amount of organic matter and on a continued supply of such matter its life depends. But certain types of soil favor or inhibit the transmission of disease by their influence upon the responsible organisms. One type of soil may favor the transmission of one disease and inhibit the transmission of another disease. For instance, "the less sandy and absorbent the soil the lower is the percentage of infection (hookworm) shown by the population."[1] On the other hand, a sandy soil provides better protection against waterborne typhoid fever than certain other types, notably a limestone formation. Again, in clay soils it is conceivable that, since its plasticity is due to a small proportion of hydrated silicate, its permeability might be so altered by the continued addition of even a small quantity of caustic lime to earthen privy vaults as to influence the accessibility of contained infection to immediately adjacent water supplies. Examples of the influence of configuration may be had in the multitude of typhoid epidemics occurring from a focus situated on higher ground, the slope of which, though decreasing the danger at the site of the focus, increases the danger of those living below.

The contained oxygen and water exert a marked influence upon the soil's ability to break down organic matter. The former is usually present in abundance, but an abundance is needed, for though vegetable matter is more slowly broken down than animal matter, due to a smaller proportion of putrescible protein, the process by which both are resolved into simpler compounds is hydrolysis. It is plain that soil moisture is essential to the life of the soil and that variations in the amount influence vital activity in the soil. In swampy regions decomposition is slow, while in the desert the soil is dead. This element is important in view of the wide variation in soil moisture at different seasons and in different localities.

A knowledge of the extent of bacterial action in soil and the levels at which the greatest activity occurs is necessary in any consideration of soil pollution problems. For though the number of bacteria active in the first few inches of the soil cannot even be estimated, it rapidly decreases with an increasing depth until at ten or twelve feet few or no living bacteria are found, except in sewage saturated soil or when carried through fissures or other

*Read in Section on Public Health, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

openings. Hence, immediate and favorable results in the destruction of any organic matter need not be expected if it be placed in a soil so water-logged that bacterial life, with particular reference to the proteolytic species, is handicapped, or if it be placed at a depth below that at which bacterial life exists.

The character, extent and degree of pollution obviously influences the relation of the soil to the transmission of disease. As has been said, practically the only character of pollution that constitutes a distinct menace to the public health is that produced by the improper disposal of human excrement. Such pollution influences the health of the individual in proportion to the degree of localization, for it has been demonstrated that the use of even a surface privy lowers the percentage of infection from hookworm disease, which is as good an index as another. In its larger relation the extent of soil pollution influences the health of a people, be it a community, state or nation, in proportion to the area over which such practice extends.

The degree of pollution is important, for while under certain modifying conditions the soil may care for a considerable amount of dangerous matter without materially jeopardizing the public health, it can be easily overwhelmed. For instance, pit privies are permissible under certain conditions, but in strict sanitary practice no privy is permissible in a city.

From the foregoing it may be seen that the soil is a vast laboratory the like of which no man can produce and the work of which no man can hope successfully to imitate. True, man can with advantage modify certain processes, hasten certain actions, and improve the distribution of activity, but any radical departure from natural methods is a departure from the logical and easiest way, is a step backward and one fraught with danger. Therefore, the development of measures by which man may hope to protect himself against his own excrement will in all probability be the simpler modifications of natural processes adapted to local needs, and not some involved and intricate mechanism born primarily in his own brain.

Some idea of the extent to which soil pollution diseases are affecting the public health and the relative importance of some members of the group may be gained from the presentation of a few figures relative to deaths, disability and the economic aspect of such disease. In the United States during the cholera epidemic of 1849-1850,

> "The deaths by this disease are reported to have been 31,506, while during the same period there were 32,874 deaths from other forms of disease of the intestinal canal."[2]

It is further stated that

> "the most terrible apprehension is aroused by the advent of Asiatic cholera . . . and yet an epidemic of cholera . . . is not during the period of its prevalence so destructive to human life as many other diseases which do not excite alarm and rarely even attract attention."

Rosenau states that in 1910, 25,000 deaths from typhoid fever occurred.[3] Despite a marked decrease in rate, in the registration states alone there occurred, in 1919, 7648 deaths, and this includes only about 80 per cent of the total population of the United States. If the same rate obtained in the other states, the deaths for the country reached a total of nearly 10,000. Of the total deaths in the registration states, 3489 occurred in eight Southern states, which means that 45.6 per cent of the deaths occurred in a unit of population representing only 16.7 per cent of the total involved.

If the basis of estimation used by Sedgewick[4] be used, the economic loss in the United States for 1919, a year with a lower typhoid death rate than had been previously known, must have approximated fifty million dollars from typhoid deaths alone. Should Hazen's theory as to related deaths be accepted and the cost of typhoid illness counted, the loss would reach much higher figures. A conservative estimate is that 80 per cent of typhoid fever is preventable. In Tennessee even with limited facilities, reductions in seven counties ranging from 50 to 88 per cent have been effected. The average reduction for all seven counties was 68.7 per cent.[5] It is evident, therefore, that could the possible reduction be effected on a national scale the economic benefit would finance a full-time health officer in each of the "3000 counties comprised in whole or in part by

our rural districts."[6] In certain states the saving would be even greater. For instance, could the 68.7 per cent average reduction secured in seven rural Tennessee counties be made state-wide in its application, it would provide a full-time health department for each of the ninety rural counties with a budget of ten thousand dollars per annum and have a balance left practically equal to the investment.

These figures include only the saving effected by a reduction of typhoid deaths and do not take into account either the reduction in typhoid sickness or the reduction in deaths and sickness from other diseases usually brought about by measures directed to the control of typhoid fever.

Hookworm disease presents a sanitary problem of major importance in this country and in the world. It is said to extend over a belt of the earth's surface 66 degrees wide and completely to encircle the globe. In addition, in certain localities outside this area it is found prevalent among miners. No accurate estimate of the number of persons infected seems possible, but "more than half the population of the globe lives in this area."[7] In 1909 Weston wrote that

"From what we know of it (hookworm disease) in this State, I would say that it costs South Carolina not less than thirty million dollars a year, and this inability to perform regular and efficient labor is the smallest part of the cost."[8]

In the measurement of disability by the hemoglobin content it has been shown that among 194,021 persons whose blood was examined three-fifths had an index below 70 per cent, and by far the largest single group (91,190) fell between 50 and 69 per cent.[9] That all of this anemia was not due to hookworm disease is obvious, but in Porto Rico the average hemoglobin as estimated for the total population over a large area rose from 43 in 1904 to 72 in 1914.[10] Similar gains after treatment are reported from many other countries.

Gains in body weight are too familiar to require citation, but the effect of hookworm disease on mentality is worthy of note. In one woman's college in the South the

"average standing of 56 infected students was 78 per cent, while that of 56 students found free of infection was 89 per cent."

In a boys' school the retardation was approximately 25 per cent. Kofoid reports that the mentality of soldiers with hookworm disease was found to be about 33 per cent below that of soldiers without it. In a study of Queensland, light infections showed an average retardation of 9.3 months as compared to an average retardation of 23.4 months in heavily infected cases. Moreover, the same study demonstrates the progressive effect in retardation in relation to duration of infection; children 8 years old were 6.6 months retarded; those 11 years, 19 months; and in children 14 years the retardation was 25.9 months.[11]

Hookworm disease is a predisposing factor to other disease and in this relation is of primary importance. From Ceylon it is reported that the death rate from influenza and its sequelae in the 1918 epidemic was twice as high among those who had not been treated as among those who had; and Kofoid reports:

"It is indicated that the resistance to disease was lowest and the mortality rates the highest among the organizations in which hookworm disease is highest."

The latter observation was made at Camp Bowie and covered the records of 24,000 men from October, 1917, to May, 1918.[12] With these facts in mind, who will have the temerity even to hazard a guess concerning the extent to which this disease is affecting the health and economic condition of the world?

Hookworm infection is not the only animal parasite the infestation with which is lowered by a reduction in soil pollution. Rosenau presents a list of the animal parasites of man which may be spread by soil pollution, which includes 37 among the Protozoa, 18 among the Trematoda, 19 among the Cestoidea, 26 among the Nematoda, and 2 among the Acanthocephala, a total of 102 parasites which, he says, have a relation to the soil during some part of their life history and may, therefore, be more or less associated with soil pollution.

Included in this list are four parasites very commonly found in Tennessee and other Southern states, one of which, Ascaris lumbricoides, I believe is more seriously affecting the public health than has

been usually thought. While figures supporting this belief are lacking, field experience confirms it to a certain extent. I have repeatedly had brought to my attention cases in which after treatment, improvement almost approximated that observed after treatment of moderately severe cases of hookworm disease.

The loss in infant life from diarrheal disease, a part of which could undoubtedly be prevented by sanitary disposal of human excrement, is an indication that the problem begins with the birth of man, and loss of life due to the dysenteries furnishes a further complication.

Even the apparently dead past is being revived, for from Russia, cholera to the extent of 27,779 cases was reported for the period January 1 to July 31, 1921, and of this number 24,000 were reported in June. The disease was present in China, India, Indo-China, the Philippine Islands, Poland, Russia, Siam and the Straits Settlements.[14]

To those of us who have been actively engaged in an effort to effect a solution of this problem the field looms as a vast region the exploration of which is but begun. While comparatively simple theoretically, in practice difficulties multiply and at times seem insurmountable. Among them may be mentioned: (1) the public attitude toward any work involving voluntary cooperation; (2) a lack of knowledge and belief in the inherent danger of soil pollution; (3) the diffuseness of the rural problem; (4) inadequate health organization and inadequate financial support of existing health organization; (5) poorly trained or untrained personnel for the prosecution of health work; (6) the essentially insidious nature of most diseases which are spread by soil pollution; and (8) the failure so far to develop a rural privy that completely meets the requirements of the situation.

All of the difficulties mentioned, save the last, can and eventually will be overcome by education. At present the lines of communication between the scientist and the public are so attenuated that very practical and often insuperable obstacles are encountered in the effort to implant the knowledge of a few in the minds of many.

Strange to say the average individual in this country is apt to resent as unwarranted interference any work that looks to the betterment of his condition, and this state of affairs is not less true of health work than other measures. The average rural dweller, for instance, regards his home as his castle and has developed a strongly individualistic attitude with but little sense of community responsibility. However, the tactful effort of efficient workers can usually overcome this attitude, though it requires the continuous effort of a well organized administration.

A lack of belief in the inherent danger of soil pollution is one of the serious obstacles to effective work and usually the older the community and the farther it is removed from the main lines of communication, the more conservative are its inhabitants toward innovations. For instance, there is the Southern highlander. Here the spread of infectious disease is rapid, no attempt is made to safeguar the water supplies, and privies of any type are the exception. A fatalistic belief in the predestination theory of disease bred by hard living conditions and poor medical service is the rule.

It is the diffuseness of the rural problem that makes it a more expensive proposition than is urban work. In a rural area the sanitary unit is a single family, while in an urban area the sanitary unit is comprised by a group of families limited only by the municipality. The difficulty is further increased by the task of convincing many single individuals instead of one group.

The inadequate health organization, particularly in its local aspect, as well as inadequate financial support of existing health organizations, needs little comment for its bearing is plain. It is said that in the United States only 154 counties, over 50% rural, were, on January 1, 1921, provided with local health service headed by wholetime health officers. This serves less than 6% of our rural communities.[15] There is no phase of health work requiring more intensive effort than soil pollution work and it has been truly said that

one good whole time health officer is worth more than twenty part time health officers who work.

Trained personnel is an essential, and adequate health organization presupposes such personnel. The present tendency to specialization, the development of public health schools, and the increasing number of medical students and physicians manifesting interest in health work offers encouragement that this difficulty is passing.

The insidious nature of most soil pollution disease is largely responsible for the public attitude of apathy toward measures directed to their control. The perfect willingness of the unfortunate infested with hookworms to "keep his worms," the utter indifference of a public menaced by wide open avenues of typhoid infection, are passing strange to the enthusiastic health worker but perfectly understandable when it is realized that neither disease is often spectacular and that familiarity with the disease and its results has bred indifference.

The fact that no rural privy yet developed fully meets all requirements is less of a handicap than it would seem, for, though the problem is chiefly rural and over 50 per cent of the population of the United States is rural, at least two general types of privy are reasonably satisfactory. The real difficulty, therefore, is not in the remedy per se but in the application on an adequate scale. It behooves us to be practical in application and to deal with improvements that can be secured rather than to hold out for an impossible ideal. Stiles has said: "Anything less than a sewer system is a compromise."[16] Obviously true, but so is the American government a compromise between the ideas of some and the opinions of others. In this connection the story is told of a "state sanitary expert" who, in one community distant from the railroad several score of miles, held forth on the desirability of a certain type of septic tank. He displayed blue prints beautifully drawn showing just how these tanks were to be made, but he forgot that the bricks had to be hauled nearly fifty miles and that the cost was prohibitive.[17] The writer further states that this was not an isolated instance of well meaning experts . . . discouraging "even the most progressive of those who listened to them."

Smith expresses the situation with reference to available instruments for the proper disposal of human excrement by stating that "the sanitary apparatus required for use in the country is summed up in two words—*fire* and *water;* the methods are strong burning and light burying."[18] The principal methods in use in this country provide ultimate disposal on or in the soil. They are: (1) the open back privy, (2) the pit privy, (3) the container privy, either vault or pail, and (4) the "septic" or bacteriolytic tank. A few other types are used, but in too limited a way to require present discussion.

The open back privy is the poorest compromise that can be made. The container is probably next if installed without scavenger service, for while in theory it is efficient, in practice difficulties arise that render it almost worthless in a rural area. I speak feelingly and from personal experience. I have been told that even th chief proponent of this type of privy has described its principal advantage as being a tendency to force the community to th installation of sewerage.

Two types, the pit and septic tank, are left for consideration. The one is but a minor modification of a method used since the time of Moses, the other a development of a comparatively recent period. Both have distinct advantages and reasonably few disadvantages. It has been claimed that each constitutes a menace to water supplies. That this danger has been overestimated is shown by Kligler in a recent monograph of the Rockefeller Institute for Medical Research. He says:

> "It is evident from the results obtained in this investigation . . . that the pit and septic privies if properly constructed are practically free from danger as far as the spread of intestinal infections of bacterial origin is concerned."[19]

The observation is confirmed from a practical standpoint by the experience of the Tennessee State Board of Health in field work. In Smith county, 57 fly-proof pit privies were built at homes in an area that had long been an endemic focus of typhoid fever. The "fever on Defeated Creek" was proverbial. Records were ob-

tained of 16 deaths in a typhoid epidemic of 1918, and 22 deaths were said to have occurred. The average number of deaths for the three civil districts, in each of which a part of this area lies, was 5 per year prior to the 1918 epidemic. Work was completed in September, 1919, and in the two years since that time not a single death from typhoid has been reported. In 1920 no cases were reported. Two or three cases developed in 1921, but I am informed by the county health officer that no case was in or near a home with a pit privy. This area is a typical limestone formation and in many places the soil depth does not exceed five feet. The average depth to limestone in horizontal strata formation will not exceed ten feet except in the creek bottoms. While ordinarily the pit privy would not have been used in such territory it was the only type save the open back the installation of which could be secured. It was, therefore, necessary to do the practical thing and make the best compromise possible under existing conditions.

The pit privy within certain limitations is a biologic solution of the problem and takes advantage of natural processes. The study of Kligler very clearly demonstrates the protective action of the soil and that "the spread of pollution from a focal point is limited in scope."[20] Furthermore, it is shown that the pollution of wells is usually surface in origin, which observation is confirmed by Rosenau and others. From this study, the experience of many others and from the standpoint of a practical compromise the pit privy would, for areas to which it is suited, seem to be the privy of choice in the present state of public enlightenment. Care should of course be taken in its location in relation to the water supply and in its construction to prevent mechanical pollution; for in limestone regions or in areas where the ground water level approaches within 15 feet of the surface its use is attended by an element of danger.

In areas where the use of the pit privy is not advisable, one of the various modifications of the septic tank offers the next most feasible compromise. It is of course superior in type to the pit privy, in that it affords a very definite shortening of the usual time taken in the katabolic phase of the nitrogen cycle. In such an environment it has been shown that pathogenic bacteria are destroyed in approximately five days,[19] and the tank should, therefore, have sufficient storage capacity to cover this period. Sewage stored so long becomes very "stale" but proper extent and construction of the subsurface disposal field will usually overcome this difficulty, since the amount of effluent from these privies is small. Other difficulties are expense and the care necessary to successful operation. The Kentucky type of septic tank is said to require a "bucket of water in each hole and urinal daily,"[21] but it has been my experience that even this amount of attention is difficult to obtain. What is believed to be an improvement on the Kentucky privy is contemplated by the Tennessee State Board of Health. The new plan will shorten insofar as is consistent with easy construction and practical operation, the first and third compartments giving the additional space to the second compartment, which is the really effective portion.

In the selection of a type of privy for community installation in rural districts attention should be given to two general factors:

(1) The soil formation and ground water level, having in mind that the vertical distance between an area of pollution and ground water is the important one, the horizontal distance being of relatively little importance except in the case of limestone fissures and other natural or artificial openings. A recent study indicates that soil reaction has an important bearing on the survival of pathogenic bacteria. Hence, this factor must also be considered.[22]

(2) Ability to secure community application of the type selected, taking into account the accessibility of materials, the economic status of the community to be served, and individual willingness to buy the degree of protection decided upon.

The situation may be summed up by saying that the fundamentally essential thing is to do the best we can with what

we have; to get dangerous matter off of the surface of the ground, place it where it is least dangerous and the best advantage can be taken of natural processes, quicken if possible those processes, but make any compromise that lessens the existing evil.

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Discussion follows paper of Dr. Williams, page 635.

UNORGANIZED COUNTY PROBLEMS AND HOW BEST TO TAKE CARE OF THEM*

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Organizing counties for public health activities is an effort that requires for its success a considerable capacity for acquiescence. As all of us engaged in this work must appreciate, public health accomplishments are usually measured negatively. We cannot always show what we have effected, we can only claim credit for prevention; and claims of that sort are less susceptible of proof than those which are based upon tangible evidence.

As a natural corollary we may expect to find, and unfortunately do find everywhere, skeptics who are with difficulty if ever convinced that public health work is a good investment. When people of that type are in the majority or where they constitute an appreciable minority, our work is not one of organization but of education. County organizations for health work depend upon popular interest; and it is our experience that when interest is lacking it is idle to force the issue.

However, assuming interest we still have our pre-organization problem. What do the people want most, what particular line of health work most appeals to them?

We have our own very definite ideas of what is best for a county, and as a general rule we are able to impress our views; but there are exceptions to this tendency. There are counties where specific lines are popular and others, which we may regard as more important, make little or no appeal. In such cases we bow to the inevitable, accept the local judgment but, taking advantage of the interest already existing, we endeavor by indirection and education to broaden the local view and bring it into harmony with the state's plan.

It may be said without exaggeration that Virginia can at present show almost every stage in the development of county health organizations. We can offer a county virtually anything that it wishes in the way of cooperation in health work.

Where comparatively small sums are available for health work, when our advice is asked we unhesitatingly recommend for a beginning the employment of a sanitary officer. This advice is predicated upon our belief that the filth-borne diseases, including intestinal parasites, constitute our chief trouble and at the same time the one most easy to control.

But there are communities with small means that will not ask our advice, or if they ask will not accept the foregoing suggestion. They want a public health nurse. If that is the local judgment we cheerfully acquiesce.

These are the elemental steps. If either is taken, the State Board of Health con-

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tributes money and supervision. If the sanitary officer is the first step, the State Board of Health not only gives its aid but also offers the cooperation of the U. S. Public Health Service, one of whose officers directs the work in Virginia. If the nurse is preferred, the State Board supervises through its nursing bureau which is a part of the division of child welfare and, as I have said, contributes financial assistance.

Possibly all of you are familiar with the duties of the sanitary officer; but in case anyone here may not know just what that official is expected to do, I shall outline briefly his duties.

He must make a sanitary survey of the towns and villages in the county and recommend such local sanitary ordinances as may be required for proper protection of the people. He must help to create sentiment for the passage of the ordinances and then endeavor to have them enacted and enforced.

He must see that the toilets and the water supplies of the schools are safe and sanitary. He must secure funds for these purposes and supervise the actual work to be done.

He must secure the installation of sanitary closets and the securing of safe water supplies at the individual homes throughout the county, and this work must not be accomplished by force unless as a last resort. Education and persuasion are far more potent than force; and the man who is induced to make his place safe will take pride in what he has done and protect his investment. Certainly no privy is neglect-proof or fool-proof, so it is very necessary that the man who does the work of safeguarding his premises is in sympathy with what he has done.

He must act as the evangel of more ramified health work, creating or intensifying interest in the plan for a complete health unit or certainly an increase of effort.

He must cooperate with the local board of health, act as its agent in carrying out measures for the prevention or control of communicable diseases.

During the winter months, when conditions are such as to render construction work impracticable, he must give talks in the schools on matters pertaining to school hygiene and public health. It has been found desirable for the sanitary officer to organize health leagues in the schools, organizations composed of pupils with their own officers, working for better sanitation and personal hygiene.

I have gone into this phase of activity somewhat in detail because it was an experiment with us. Our sanitary officers are all laymen; and they have proved remarkably successful. We believe that more and more can intelligent laymen be used in health work that is not sufficiently remunerative to prove attractive to medical men. The time has gone when health work could properly be considered as a field exclusively reserved for members of the medical profession. The intelligent layman of today knows far more about the causation of disease than any doctor knew fifty years ago; and our use of laymen as sanitarians in Virginia has satisfied us that the experiment is advisable.

I need not amplify the duties of the public health nurse or the school nurse. All of you are as familiar with them as I am. There is always a sentimental appeal in nursing work, and it is possibly easier to get counties to undertake that as a beginning, but, whether the nurse is the first step or the sanitary officer marks the beginning, each is urged to work for the additional employment of the other as soon as possible.

Since I have discussed malaria control as a part of a rural health unit in another paper, I shall confine myself in this paper more particularly to matters of community sanitation and organized work for health in schools. Our sanitary officer is a builder, his chief function, beside which all others are incidental, is to see that the filth-borne diseases are reduced to a minimum. To accomplish that result he must have sanitary privies and safe wells or springs. He is told to make that his chief end in life and his excuse for being on the job.

Building work is one thing that can easily be appraised in terms of money; and I am sure that you will be interested in that aspect of the Virginia experiment.

I recently had compiled expenditure figures for the eleven months ending September 1, this year. These figures refer only to costs of the campaign for better sanitation.

During the twelve months, the State Board of Health spent $9,926.43. County appropriations amounted to $12,115.13. The U. S. Public Health Service spent, exclusive of salaries of certain officers temporarily assigned to assist the State Board, $5,585.23; and private individuals or small communities spent $111,601.55. Of the total amount, $139,228.34, just about seven per cent was spent by the State Board of Health. This expenditure of money is represented by nearly five thousand new sanitary privies, several hundred new or improved wells and a number of springs sanitarily safeguarded.

We believe that county health work should be done by the counties under the direction of the State's central authority; and our various methods of state aid are encouraged because they tend to create initial interest in the activities that we wish to have undertaken. We do not conceal our hope that ultimately the actual expenses of such work in the field will be as much a part of the counties' duties toward their people and as clearly recognized as they are now a part of the obligations of the cities.

This thought leads us to the higher stages of health work in rural sections. The goal is a full time health officer who is a physician, a sanitary inspector, one or more public health nurses, a clerk and such other assistants as may be deemed necessary, including some one with special experience for malarial control. Several Virginia counties are so equipped. There are five counties which have certain partnership agreements with the State Board of Health in the conduct of complete health units. To a limited number of counties we can offer any part or all of five thousand dollars annually for a health organization provided they are willing to advance a similar sum. Twenty-five hundred dollars comes from the State's appropriation for the Health Department, a like sum from the International Health Board and the rest from the county, either wholly or in part from public funds.

As you know the agreements with the International Health Board are on a declining scale. The maximum is given the first year; but afterward the county is expected to increase its proportion of the joint fund. Ultimately this outside aid ceases; and then the counties will have to care for their own problem with such incidental help as the State Board of Health is able to extend through its other agencies, such as nursing appropriations or aids in sanitation.

This plan of diminishing aid has its advantages in making the counties more self-reliant. We have now in Virginia four counties, expending each from $8,000 to $15,000 annually for health work, no dollar of which is secured from outside sources. All of the money comes directly from the local treasuries or from local contributors. Such counties are placing themselves on the same ground as the cities, caring for their health matters as they do for police protection or any other subject of recognized governmental concern.

Last year there was in Virginia as elsewhere not a little business depression. Ours is largely an agricultural State; and the products of farms were selling at very unsatisfactory prices. We grow comparatively little cotton for we are the northern limit of the cotton belt; but the cotton counties were much depressed. We are large growers of tobacco, and the prices for tobacco were extremely dissatisfying. We suffered as much as other growers of cereals. Yet, despite these handicaps, comparatively little health work was abandoned by the counties; and where some had to be stopped, county authorities almost invariably expressed regret and gave the impression that better times would witness a resumption of activity.

We attribute our success in creating such an attitude primarily to our policy of avoiding force, even where the law is being violated, until patience so plainly ceases to be a virtue that we should be condemned more for tolerating disobedience than we should be for punishing it. Unless the wilful disobedience is long continued and its

results endanger individuals or families not connected with the recalcitrant person, we hesitate to ask for a conviction; but we will not permit the continuance of a nuisance that constitutes a menace to public health; and when we make the people understand that phase of the subject we have their sympathy.

And this leads to the part of our campaign that we regard as being the next best contributor, that is the kind of education we are constantly giving the public. We try to emphasize the ease of prevention and the difficulties of cure. We spread broadcast over Virginia our disease chart which shows how the communicable and non-communicable preventable diseases are classified. We try to make old and young understand that they cannot get typhoid fever unless they get into their system some portion of the bowel discharge of a person who has typhoid or is a typhoid carrier.

We do the same for the other intestinal diseases; and we lay particular stress upon the throat and nose diseases, the spray-borne and the non-spray-borne. We have laws against the common drinking cup and the common towel. We have plastered the State with placards and hang them in every school room, placards that urge the covering of coughs and sneezes and the keeping out of one's mouth fingers or anything else that does not belong there.

We issue pamphlets in simple language, describing ways of avoiding disease and safeguarding oneself against disease. We give health lectures, we hold clinics, we show motion pictures.

All of these efforts we consider valuable in themselves; but indirectly they are even more valuable, for they create an interest in health work, a belief that the State Board of Health is on its job and working for the people, and they pave the way for local activities on a community scale. It is almost bromidic to remark in a conference of health officers that public health is a purchasable commodity. We know that so well that we think everybody should know it; but they do not.

Consequently health appropriations are never so large as we would have them. I cannot complain of my State. Our appropriations are steadily growing. Of course, the more spectacular efforts, like tuberculosis control, get what most of us consider a disproportionately large part of the total; but general health work is being regarded with constantly increasing friendliness.

In conclusion, I would say that in organizing counties for health work or in urging such organization, I have found it effective to make a practical use of a very demonstrable experiment in another line. We have seen during recent years a steadily declining annual total of accidents on railways and street cars. That has been the result of a "Safety First" campaign assiduously pursued. Care will not prevent all accidents; but as you reduce the chances of accidents, so in almost equal ratio you reduce the number of accidents. It is the same with diseases of the communicable kind, or preventable whether communicable or not. If you reduce the opportunities, the incidence will be reduced.

This is the answer to those who disclaim interest in county sanitation because all the people will not sanitate. It is a complete answer; and is one that creates interest by its very simplicity, a most desirable result for any campaigner to attain. And this analogy is peculiarly applicable to privy building for there are some good studies on this subject and they bear out the theory. I continue to return to the sanitary topic for I believe it to be the matter of most concern to all who live in mild climates; and it is my firm belief that tuberculosis and many other diseases that cause so much distress and so many fatalities would probably be far less common if we could banish the filth-borne germs that inevitably lead to lowered resistance.

That is why we, in Virginia, start our organizations in counties, whenever possible, with a sanitary inspector; and it is a form of organization that has worked exceedingly well with us. We unhesitatingly recommend it for counties that cannot afford, or are unwilling to afford, a larger experiment, being confident that it

will be with the others, as it has been with those who have tried it, satisfactory to the locality and helpful to the cause of public health.

DISCUSSION

Papers of Dr. Harrison, Dr. Bishop and Dr. Williams

Dr. J. A. Hayne, Columbia, S. C.—We are gradually evolving method out of the chaotic conditions which were at first found when we attempted the prevention of soil pollution. I remember the enthusiastic discussion in regard to various types of privies that were all going to solve the problem, and I am glad to see that the gentlemen have now come to the conclusion that all types do not carry out the ideas that were intended when these sanitary privies were first advocated. We have endeavored to do a good deal of work in South Carolina against soil pollution, and I presume we have succeeded. At least the statistics would show that we have. We had, in 1915, ninety-six hundred cases of typhoid fever, according to the statistics; and last year we had twenty-five hundred cases. We made a survey of the state and found that hookworm infection after the hookworm aid was withdrawn had considerably decreased. We found in the first survey that about eighty or ninety per cent of the people were infected. The method was to go around the school room, picking out those who had or had not hookworm by the anemic condition, and a very large percentage of hookworm was found. After the enthusiasm lessened, scientific methods were used, the stools were examined, a reasonable amount of hookworm was found in the state and a small amount of hookworm disease.

A dog gets along very well with a few fleas. The person carrying around a few hookworms in the intestinal canal is not particularly annoyed by them; but if he has a great many that are really sapping his vitality, then he develops hookworm disease. This distinction should always be made. I have seen hookworm disease in Panama. In South Carolina I have seen hookworm infestation. In a certain university 70 per cent of the students were infected with hookworm, yet they went into a football game with no difficulty.

I am opposed to this peripatetic instruction of laymen on sanitary lines, as carried out in some counties. You must drink deeply of the Pierean spring or not at all. I do not believe in turning loose laymen with a little knowledge. They should be able to impress the people with their accuracy. You must be able to speak *ex cathedra.* You must be by the people the acknowledged authority upon the subject before you can speak to the people and get them out of the habits which have come down to them through the centuries. I believe the only man who has really succeeded in doing anything of the kind is the man thoroughly trained in medical lore, and the man who, in addition to that, has had training in public health work in all its phases.

I am tired of specialization in the medical profession, still more tired of specialization in public health work. Why is it that we have to have a specialist on malaria, a specialist on child welfare, on this and on that, all pulling against each other, all quarreling, all of them giving the impression to the state and to the people at large that none of them knows what he is talking about? What we want is to give a county the same kind of department of health that we would give to a city and to have there a health officer, a laboratory, and a sanitary inspector or two, a nurse, an office, a clerk, a telephone, and all the paraphernalia necessary for the successful carrying out of a department of health. Otherwise, do as we do in South Carolina.

I send out a man from my office in Columbia instructed to do certain things and I bring him back. I do not make him the head of a department of health in a county if he is a layman. It never works.

I wish, as the public health worker likes to say, to "leave this thought with you:" that we have not yet solved the question of a sanitary privy which we can recommend to the people, that we have not yet formed a plan by which we can have in the county a properly operating health department. I have not seen one in the United States. I think perhaps they have sanitary closets in Kentucky. I understand there is a sanitary privy in a glass case in the capitol at Louisville, and that is the only one I have been able to find in looking over Kentucky. In sitting on the cars all the way from South Carolina and Columbia to Hot Springs, I passed through many, many rural districts, and I am sorry to say I did not see one.

Dr. E. A. Hines, Seneca, S. C.—It appears to me that in rural sections of the country a more strenuous campaign in the interest of anti-typhoid vaccination would yield more certain results than to wait until health departments are established in such areas. In other words, I am aware that a chain is no stronger than its weakest link and that modern sanitary measures should be pushed in every community, but if anti-typhoid vaccination has proven so efficient in all of the armies of the world, why not make such a campaign the chief point of attack over the greater part of this country instead of waiting for an all-round 100 per cent effective sanitation campaign? The profession generally and the laymen especially may become more keenly interested in such a procedure as this. I should like to ask in this connection if any one present knows of serious failures of protection from properly administered anti-typhoid vaccine. Vaccination has been very effective in the rural districts under my observation with practically no sanitary measures carried out in connection therewith.

I should like to ask Dr. Williams how he trains his lay inspectors.

Dr. P. E. Blackerby, Louisville, Ky.—I wish to ask Dr. Williams if he has any local supervision over his sanitary officers in the way of a county board of health, how long any of these sanitary officers have been in the county, and whether there is a demand to perpetuate their work in those

counties year after year, and whether any of the demonstrations have resulted in an all-time health department?

Dr. W. S. Leathers, University, Miss.—As I understand it, in the prevention and control of typhoid fever there are three factors that should be emphasized, namely: education, sanitation and vaccination. The use of typhoid vaccine should never be substituted for proper sanitation in the prevention of typhoid fever. While it is realized that the pit privy is not by any means what it should be and what may be termed an ideal mode of disposal of sewage at the country home, at the same time it seems to be one of the most practicable methods that may be used with our present state of educational advancement. The average person would rather provide proper sanitary surroundings at the home than to use some therapeutic measure in the control of disease. It is, however, true that the use of typhoid vaccine is a most helpful agent in the control of this disease. So I should emphasize continuously in the reduction of typhoid morbidity and mortality the three fundamental methods of procedure, namely, education, sanitation and the use of typhoid vaccine. Of course, sanitation means the building of privies at the homes of the people in the country so that soil pollution will be prevented and the possibility of the contamination of water supplies avoided.

Dr. C. H. Kibbey, Tennessee Coal, Iron and Railway Co., Birmingham, Ala.—Sanitation is unquestionably the thing to stress in the control of typhoid fever and all the filth-borne diseases. I have been somewhat surprised that the thing I consider of first importance in the control of typhoid (going back to the first paper) has not been sufficiently stressed. I refer to case epidemiology. Until such time as we can have all discharges properly taken care of, we are going to continue to have the epidemiological problem of typhoid fever confronting us. In order to destroy properly all the infectious material of this disease, it should be done at the bedside, that is, we need case epidemiology. There is something spectacular about going into a community and fighting typhoid fever where we have a large number of cases, and it is possible for the sanitarian to make himself quite a reputation by stopping an outbreak of typhoid after a number of cases have developed. It is usually easily done. However, the best way to control typhoid is to take precautions at the bedside on the appearance of the first case. In order to do this, it is necessary to have that case promptly reported. There is a very general practice on the part of health departments to have physicians in their districts report their cases of typhoid fever. There is a great tendency on the part of physicians to report cases of typhoid only after a positive Widal is made, which may occur anywhere after from two to four weeks of the disease. Or if he does not get a positive after one or two efforts, he may never report the case as typhoid, but may let it go as something else. I have in mind two outbreaks of typhoid fever occurring in my district within the last year, where the first case of typhoid fever was never reported as typhoid, because of the fact that a positive Widal was never made. In our organization, comprising something in the neighborhood of one hundred physicians, it is our practice to have our physicians report suspected cases of typhoid fever. Every time one of our physicians finds a case he suspects to be typhoid, he immediately telephones the location of that suspected case, and immediately all precautions are taken by the sanitary forces as if it were known to be typhoid. If it afterwards develops that it is typhoid fever, we are safe; if it does not, we have not lost much. In the language of our friend from South Carolina, "I leave this thought with you."

Dr. L. B. McBrayer, Sanatorium, N. C.—There are a number of objections to the immunizing against typhoid fever, the most serious of which is that it is supposed not to last more than three or four years and then it has to be repeated. While our people once accepted it well, if we have to go around repeating and repeating it, they may grow tired after a while. The installation of surface closets is feasible. It is more difficult in the country than it is in villages. I know a town that was having a hundred and twenty cases of typhoid annually only a few years ago. They had twelve hundred surface closets in town of the open-back type. The health department of that town was interested in that typhoid and they finally developed a privy that they thought would meet the needs and secured its installation in every place that was not connected with sewers. They had what we called at that time a sanitary privy, which has probably not been improved upon since for the village or town. We did not get them in until early summer, but typhoid fever was cut in half that year. Next year it was reduced to fifteen cases. That was just before the immunization against typhoid fever had been worked out.

In that health department every dairy that furnished milk in the city had to come up to certain standards, and in reporting cases of typhoid fever among the things reported was the name of the dairy from which the family secured its milk. One summer there developed two cases on a milkman's route, and we started to investigate. Before we got through with the investigation there were two other cases. That is, four cases out of fifteen that summer occurred on this man's route. He was notified that if the source of that infection was not found by the next morning (that was in the middle of the afternoon), his dairy would be closed up. He got interested as well as we. Before morning it developed that the wife of one of the milkmen had been sick, not very sick, but had been sick for a week before she went to her father's, and that typhoid developed after she went to her father's.

In another instance, three cases occurred on a milkman's route. An investigation disclosed the fact that the man running the dairy had had typhoid fever, and on examination of his feces it was found that he was still a carrier. Of course, he was not allowed to furnish milk for the town any more. The dairy was closed up.

In closing let me say this: that the installation of surface closets, certainly where the

neighbors are close together, prevents many other diseases besides typhoid: for example, diphtheria, dysentery, summer diarrhea, etc. So it seems to me that the idea of abandoning the surface closet is not well taken, and that from every standpoint it is necessary that the health workers of the Southern states should do what is necessary to put the thing over. It can be done.

Dr. Harrison (*closing*).—There are many difficulties, and perhaps some drawbacks, in immunization by inoculation. There is a great deal of positive proof that where the infection is sufficiently great the inoculation will not immunize. Furthermore, it is wise to use all the methods possible; to try to immunize as many as possible, of course, but at the same time to take all the other precautions in the way of anti-soil pollution measures, etc., to eradicate the disease.

I am sorry if I failed to impress the point of case epidemiology. I did mention that we should by all means attempt to eradicate the disease "in the bed pan," and we should instruct each household in the proper method of the disposal of the very dangerous excreta.

I should like to say a word or two in regard to Dr. Bishop's paper. As a worker in the same field I want simply to hold up for inspection the enormity of the proposition that confronts us in the control of soil pollution diseases. First of all, we have to obtain the money necessary for the work from state legislatures. Enough said.

Secondly, we have to convince the people in the rural districts of the value of soil pollution work, and we have all had experience, who have attempted to carry on this work, with the type of man who, after a long and careful explanation of the benefits of the work, will say, "Well, I don't take very much stock in this theory of disease germs after all." Again, enough said.

Thirdly, we have to select men sufficiently able to carry on this work. First of all, the man must be a graduate physician. Next, he must have had a certain amount of training in public health work. He must, above all other things, be a practical individual who can impress his work and the worth of his work upon his community. After we have succeeded in finding such an unusual individual, we discover that he is able to command a salary that is about two or three times in excess of what we are able to offer him. Those are some of the problems that must be solved in carrying on this work. Nevertheless we are making progress. We are gradually getting somewhere with the work and we must certainly press forward.

Dr. Bishop (*closing*).—In Tennessee we confine our work mostly to health demonstrations, that is, in our county health work. We have not yet progressed to the point of full-time health departments with all of the activities of such a department. In the demonstration work we investigate every case of typhoid, beginning control with the case, which is the focus. The case is then followed up by the public health nurse, the primary investigation being made by the physician. We try to teach the person or persons attending the case the principles by which the family and community may be safeguarded, recognizing that the family physician probably has other duties more pleasant to him than this. One of the main principles in typhoid control is that attention must be paid to each individual case.

Next, of course, come the two other recognized principles, the more permanent control by sanitation, which no one can reasonably deny is the final solution of this as well as other soil pollution problems, and vaccination. In certain cases where we have secured remarkable reductions, we have been able to give vaccine to about thirty-three per cent of the population. That means a much larger percentage of the non-immunes in all probability, because most vaccination is confined to that age period which has the highest percentage of non-immunes. When you have said the three words vaccination, education and sanitation you have said all there is to be said of typhoid control.

Dr. Williams (*closing*).—The various lines of health work must be looked after from the standpoint of their relative importance and the possibility of getting results with a given amount of money. The prevention of venereal diseases is a part of health work and, of course, should be done. But from the standpoint of my state, I consider that with a given amount of money we can save more lives and get greater results by fighting the filth-borne disease.

The pit privy has been criticised unfavorably by some. Properly constructed it will prevent all hookworm disease. We can agree to that. It will prevent fly-borne typhoid. Most typhoid I believe in the summer time is fly-borne. If it will do those things it will do a great deal. The possible danger from the pit privy is the pollution of the underground water. When the pit privy is built according to directions, one hundred feet from the spring or well, it will prevent most of the underground water-borne typhoid. So I have a great respect for the pit privy. It is certainly the cheapest type of nearly fool proof privy that we have.

In regard to the layman in health work, a doctor without public health training is a layman to the man who has had training in fundamental health work, even though he be not an M.D. We did not come to this question of using laymen or using non-M.D.'s all of a sudden. It came to us after we had tried the M.D.'s and found several wanting and found it very difficult to get others.

In one county the people wanted to get rid of the doctor and put a layman in his place. He was a man who had been inspector and who had done splendid work and who had kept up the full interest of that county in doing the work. He was a layman who had had public health training, and he has made good.

We did not try the layman until we tried the doctor, and we found it very difficult to get doctors with the proper treatment. As our Chairman said, the great qualifications for health officers are the proper temperament and ability.

It is true that we have had to get rid of half the laymen that we tried. We first try to select men that we think will make a success. We put them in a county to work with a man for a month, going with him on his daily rounds. He must be a man who wants to learn and will read and learn methods and learn from those men doing the work. Then we send him to a county. We have a supervisor for every four sanitary demonstrators or inspectors. We at first tried doctors, but gave them up. What we are after is results. We keep the men that get results. One week in every year we get all the workers, including doctors and nurses, to come for an intensive course of study of one week.

In our state every county has a board of health. Three doctors appointed by the State Board of Health and the chairman of the Board of Supervisors make up the county board of health. These doctors are usually very busy men. Where we go into a county it is done with their full consent and approval. They must recommend it before we go there. There must be perfect harmony.

Our inspectors have even been used to vaccinate. In one of the counties the medical member of a board of health was a leading man in the State Medical Society and was more jealous of the prerogatives of the profession than any man I know. He did not want any man not connected with medicine to do health work. The county made an appropriation and we could not get a doctor. After we had tried four or five times we recommended a man who made a great success. That doctor has been converted and is enthusiastic in behalf of the lay health officer. He has even asked that man to vaccinate twelve hundred children in the county.

A Member.—Does this lay health officer exercise any police power, quarantine and enforcement of regulations?

Dr. Williams.—Yes.

A Member.—Suppose a difference of opinion arises in a county as to whether you have smallpox or chickenpox, would a layman make the diagnosis?

Dr. Williams.—The layman has nothing to do with the diagnosis of communicable diseases. If there is any unusual outbreak, that is turned over to our sanitary engineering department, and they are very skilled in the epidemiology of typhoid. The lay officer takes the diagnosis of the doctor.

A Member.—How do the school teachers inspect the children?

Dr. Williams.—At all normal schools, the winter normal schools and the summer normal schools, the teachers are taught to do that inspection work, and if there is a nurse in the county she helps teach the teachers. We have also a correspondence course for teachers because many of our teachers could not attend normal school. Last year six hundred teachers took the correspondence course, which covers these points.

SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

CONSIDERATION OF THE SURGICAL TREATMENT OF BRONCHIECTASIS*†

By Evarts A. Graham, M.D.,
St. Louis, Mo.

The treatment of bronchiectasis has always been unsatisfactory. Most measures which have been advocated have at best given only temporary relief. It is not the purpose of this article to discuss all the procedures which have been tried, but to mention only those which might be considered surgical. Of these measures the more radical chiefly will be emphasized.

Many cases will respond to comparatively simple procedures, and in probably no case should recourse be had to radical surgery until after less radical measures have been tried. Some cases of localized bronchiectasis are associated with a foreign body which has been aspirated into the lung and which can be removed through a bronchoscope. The removal of the foreign body will often result in a striking improvement in the patient's condition. All cases of suspected bronchiectasis should have careful x-ray examinations, a fact which is strikingly emphasized by the importance of the recognition of a foreign body. Another comparatively simple measure which is sometimes very effective is artificial pneumothorax. In the less severe cases it will often result in a marked diminution of the sputum, a gain in weight and an improvement in the patient's general condition. Dr. J. J. Singer and I have now under observation a case of bronchiectasis of recent development in a woman of middle age who has had almost complete symptomatic relief for about six months as the result of an artificial pneumothorax.

But there are other cases in which, despite the use of artificial pneumothorax and other conservative measures, no marked improvement occurs. In such cases as these, the patient is either doomed to a life of misery and of general offensiveness to those who are compelled to associate with him or he must undergo a more radical procedure.

The surgical treatment of bronchiectasis is heartily condemned in most text books and articles which deal with this subject. It is not surprising that it should be, for the early surgical treatment was most irrational and ill-advised. Based upon a mistaken idea of the pathology of the condition, simple incision was practiced with the idea of draining a cavity. Obviously such a procedure was doomed to failure for the simple reason that little, if anything, could be accomplished by the drainage of only one of many purulent cavities or dilated bronchi in the lung. Difficulty in diagnosis gave rise to much confusion between abscess and bronchiectasis and operations were sometimes undertaken with the erroneous idea that the patient was suffering from an abscess which could be relieved by simple incision. Moreover, as a rule, the operation was undertaken as a last resort in patients who were exceedingly poor surgical risks.

From a statistical standpoint the tale is an exceedingly mournful one. Quincke[1] reported 15 cases treated almost entirely by incision into the lung. Of these, one was entirely healed; 6 (40 per cent) were improved; 2 (13 per cent) remained unhealed; and 6 (40 per cent) died as a direct result of the operation. Thus 53 per cent were either unhealed or died. Tuffier's[2] statistics are:

Operation	Cases	Improved or Healed	Died	Per Cent Mortality
Pneumotomy	38	28	10	26.3
Pneumectomy	1	0	1	100.
Thoracoplasty	1	0	1	100.
Puncture (Trocar)	5	3	2	40.

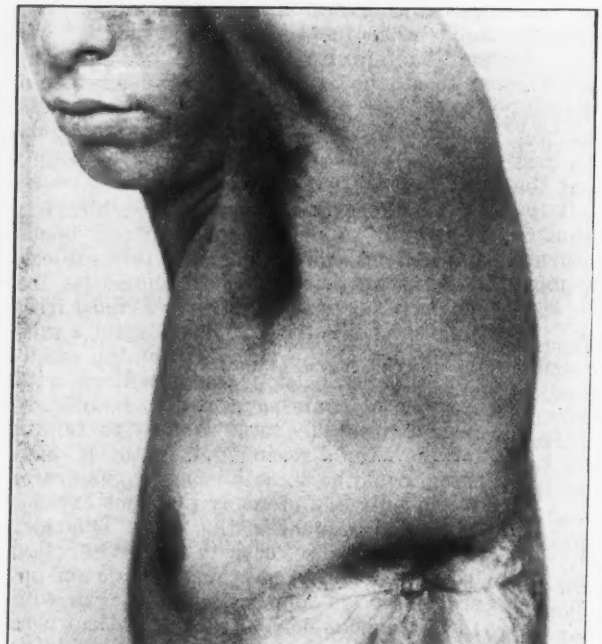
*From the Department of Surgery, Washington University School of Medicine.

†Read in Section on Surgery, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

Korte, in a series of 21 cases, had the following results:

Operation	Cases	Healed	Died	
Pneumotomy	15	4	11	(73.3 per cent)
Unfinished operation	2	1 (?)	1	
Putrid empyema after bronchiectasis	4	0	4	

Garre,[3] in 1901, reported 36 "healed" cases out of 57; but he considered that of these 36 cases, surely not half were really healed. Sauerbruch, in collecting these various cases in 1911, found that of 123 cases of bronchiectasis which were treated by pneumotomy, 40 (33 per cent) were said to have been healed; 7 (6 per cent) were improved; 33 (27 per cent) were unhealed; and 43 (35 per cent) died. Because of the confusion in diagnosis between bronchiectasis and lung abscess it is doubtful that as many as 40 cases of bronchiectasis were really healed by simple incision. It seems more probable that many of these cases were lung abscess.



Photograph of patient nine months after removal of the left lower lobe of the lung for bronchiectasis of about fifteen years' duration. It has been entirely healed for five months and the patient is now perfectly well and able to work for the first time in three years.

Sauerbruch[4] has operated upon two cases by his method of ligating the branches of the pulmonary artery to the lung. Both cases were said to have shown improvement as to the amount of sputum, but certainly as described in his report the results could not be considered as at all satisfactory. The object of the operation is to cause shrinking of the lung with the idea of compressing the bronchial dilatations. Based upon a similar idea is the treatment with artificial pneumothorax in an attempt to collapse the lung. Thoracoplastic operations by removal of ribs have also been performed with the same idea. All of these collapsing methods will frequently make a patient feel a little better temporarily and will diminish the amount of sputum, but the fundamental defect in this type of procedure is that it will not arrest the progress of the disease. As a rule, the relief gained is only temporary. Such methods treat a symptom rather than the disease itself.

There is only one rational radical method theoretically, and that is the removal of the diseased portion of lung. From the nature of the pathology of the condition, whether it is cylindrical, sacculated or fusiform, it is hardly to be expected that healing of the dilatations could occur. Removal of them, therefore, seems necessary. To Heidenhain[5] apparently belongs the credit for first undertaking deliberately the removal of a lobe of the lung for bronchiectasis. He removed the left lower lobe after two previous operations had been done for drainage. In 1914, Meyer[6] found that 16 cases had been reported in which pneumectomy had been performed for bronchiectasis. Of this number 8 were

classed as cured or improved and 8 died. He reported, in 1915, another case operated upon successfully by himself. Lilienthal,[7] in 1916, reported 7 cases of his own, of which 4 were said to have been cured and 3 died. Robinson,[8] in 1917, reported 5 cases in which he had made a complete removal of a lower lobe with 1 death. In a recent personal communication I have learned that two others of Robinson's cases died subsequently to the writing of his article soon after the operation. Recently (December, 1920) I successfully removed the left lower lobe for bronchiectasis in a boy 17 years of age who had had symptoms of the disease since the age of 3. When last seen (August, 1921) he had been entirely healed for four months with no evidence whatever of a bronchial fistula, and he was moreover entirely free from symptoms. Another case, more recently operated upon, died from a suppurative pericarditis.

In 31 known cases, therefore, of pneumectomy for bronchiectasis, 15 have died, an operative mortality of 48 per cent. Moreover, of the 16 who have survived the operation, not all have been completely relieved of symptoms and some have been left with troublesome bronchial fistulae. Smith and Mudd,[9] in 1917, carefully analyzed the cases reported up to that time, and they believe that only three are complete successes, two of Lilienthal's cases and one of Robinson's. I would venture to add the case of my own, an abstract of which is given below. This, then, would make 4 cases (13 per cent) out of the 31 in which the result has been entirely satisfactory.

One is tempted to conclude from the foregoing analysis that any operative procedure which carries with it a 48 per cent operative mortality and only a 13 per cent chance of complete success should be abandoned. On the other hand, there are many reasons why such a conclusion should not necessarily be drawn at this time. In the first place, in many of these cases lobectomy has been done only as a last resort on patients who were extremely bad risks for any important surgical procedure. If a better selection of cases had been made, doubtless the results would appear much better. A complete relief from all symptoms cannot be expected from the removal of one lobe if other lobes are involved. Furthermore, when advanced changes have occurred in other organs as a result of many years of suppuration in the lung, good results are hardly to be anticipated. Yet in general it has been this very type of case which has constituted most of those in which lobectomy has been performed. Unquestionably better results would be obtained if the operation were limited to young patients in whom the process is confined to one lobe and has not run a sufficiently prolonged course to affect seriously the kidneys, heart and other viscera. Thoracic surgery is still in a very undeveloped condition; and improved methods, together with a better knowledge of the fundamental physiology involved in operations within the chest, will almost certainly improve results. In all important operations the mortality at first has been high. For example, as recently as 1905 Matti[10] compiled statistics from German clinics on the operative mortality in carcinoma of the stomach and found rates varying from 68 to 17 per cent (average 43 per cent). Yet by 1909 at the Mayo Clinic the operative mortality (partial gastrectomy and pylorectomy) had been reduced to 8.6 per cent (Binnie).[11]

Bronchiectasis, of course, in general affords a longer prospect of life than does cancer. Yet, like cancer, it is a condition from which spontaneous recovery probably never occurs, and the danger of a sudden termination of life by some complication such as hemorrhage, brain abscess, etc., is a very real one. Lobectomy in properly selected cases will certainly offer a better chance of complete recovery than any operation in cancer of the stomach; and even if the operation is not completely successful the patient who survives is almost assured of great improvement in the condition which has been graphically described by Robinson in these words:

"Bronchiectasis is a chronic, loathesome disease, generally regarded as incurable. The expectoration is disgustingly profuse; consequently the afflicted loses employment, shuns society, becomes a recluse, and not infrequently resorts to dissipation. He is pale and a trifle cyanotic. His fingers and toes are clubbed. He labors with early fatigue. He coughs spasmodically, with varying persistency. Stooping, laughing, eating, hurrying, flood his trachea with pus and he retires, em-

barrassed, to drain himself of abundant sputum. In winter he is periodically ill with severe "colds," sometimes with bronchopneumonia, nor does the mildness of summer rid him of chronic cough. He may live many years, till cerebral abscess, pneumonia, septicemia, amyloid disease or hemorrhage happily ends his existence."

The principal dangers in the operation of lobectomy are: (1) those dangers with which a serious operation is always associated in a subject whose general condition is poor, and (2) the danger of infection, particularly of the mediastinal space. These patients are always the victims of a more or less chronic sepsis; they are underweight, anemic and usually somewhat cyanotic. In addition they have some impairment of kidney function. The danger of infection of the mediastinum is a very real one. The stump of the bronchus always contains bacteria, and it is of course in direct communication with the mouth and upper air passages. If the mediastinum is not stabilized by induration and by adhesions the bronchial stump is very likely to retract between the two leaves of pleura and give rise to a suppurative mediastinitis. Hemorrhage as a rule does not constitute a very real danger unless there is an accidental slipping of a clamp or ligature from the pulmonary artery.

There are two principal methods of operating, one by an intercostal route and the other by a preliminary resection of ribs. Of these the former constitutes by far the more brilliant procedure and, when successful, gives the least deformity; but unquestionably it is also more dangerous. This is the method which has been advocated by Lilienthal and used by him in 5 cases with 2 deaths. The other method was used by Robinson in his series of 5 cases with 1 death. It is also the method which I used in my successful case. It is a more laborious procedure, but it has many features of safety not possessed by the other method. In the first place, it can be done in any number of stages, a fact which makes it more applicable to patients who are not in the best condition. Moreover, it practically insures against the possibility of retraction of the bronchial stump into the mediastinum.

The operation as described by Robinson is essentially as follows: a crescentic incision is used the convexity of which is downward. It starts at the level of the fifth rib about two inches from the vertebral column, crosses the eighth rib in the scapular line and ends at the level of the sixth rib in the mammary line. The skin and fat are turned up and the latissimus dorsi is divided transversely to form part of the flap. Subperiosteal resection of the seventh, eighth and ninth ribs is made from their angles to the anterior axillary line. The intercostal bundles are then ligated and removed. The flap is brought down and sutured in place without drainage. This constitutes the first stage. An interval of a week or more may be allowed to elapse before the second stage. During this time it is hard for the patient to cough up his sputum because of the absence of the removed ribs. This will be facilitated by applying a dressing made to fit snugly against the flap by adhesive plaster bands which are long enough to adhere firmly to the skin.

At the second stage the flap is elevated and the pleura opened. The diseased lobe is usually adherent not only to the chest wall, but also to the pericardium and diaphragm. These adhesions must be carefully separated and will generally require cutting in some places. If the other lobe is not adherent, safety requires that it be made so before proceding to the amputation. There are two reasons for this, one of which is that respiration will be much less disturbed if the other lobe is fixed, for in that way the usual dangers of a wide-open pneumothorax are avoided. The second reason is that the infection of the pleura which is practically certain to follow the lobectomy will not be generalized but will be localized. If the other lobe is found not to be adherent to the chest wall, the diseased lobe, after being separated from the adherent structures, is surrounded and walled off by gauze packing, and the wound is closed tightly without drainage. This constitutes the second stage.

On about the third to the fifth day the wound is opened a little in order to let out some of the fluid secretion which has accumulated. It is better, however, to remove the packing only gradually so that it will not be entirely removed before about the tenth day. This delay practically insures the presence of adhesions between the

chest wall and the other lobe. New packing must then be carefully replaced. In my own experience, however, instead of replacing the packing I inserted several Carrel tubes and irrigated the cavity with Dakin's solution in order to promote rapid sterilization of the empyema cavity. The third stage should not be undertaken until the cavity is clean. If a long interval has elapsed, it may be necessary at the third stage to separate adhesions which have formed again between the diseased lobe and surrounding structures, but the separation should be easy. At any rate two important objects have been accomplished by waiting, the shutting off by adhesions of the part of the pleural cavity occupied by the unaffected lobe and the stabilizing of the mediastinum so that the danger of retraction of the bronchial stump is minimized.

The amputation of the lobe may be carried out as soon as the patient is in good condition and the cavity is clean. In my own cases this was done easily and quickly, and in the successful case the patient had less reaction than after either of the two previous stages. The adhesions all around the lobe are separated and one or two curved clamps are placed on the hilus. The lung is then cut away distal to the clamps. Mass ligatures may be applied or the clamps left on to be removed in from five to seven days. One advantage of leaving the clamps in place is that the bronchial stump is then firmly held in place and cannot possibly retract into the mediastinal space. The wound is not sutured, but the flap is allowed to fall into it. It should be irrigated carefully because some degree of bronchial fistula is practically certain to be present. The cavity gradually becomes obliterated and the remaining scar tissue is covered with epithelium. The persistence of a bronchial fistula may necessitate a plastic operation for its closure. In my own case complete spontaneous healing occurred.

Nitrous oxid is decidedly preferable to any other anesthetic, not only because it does not stimulate bronchial secretion so much as ether, but the added advantage exists that, as Gwathmey suggested, the lungs can be partially inflated by blowing in gas under a little pressure if a snugly fitting face piece is used. This facilitates respiration greatly while working in the open pleural cavity if adhesions are absent between the unaffected lobe and the chest wall.

ABSTRACT OF SUCCESSFUL CASE OF LOBECTOMY

Patient, male, age 17, entered Barnes Hospital November 1, 1920, referred to me by Dr. J. J. Singer, who made a diagnosis of bronchiectasis involving the left lower lobe. Since the age of two, the patient had had a chronic cough. For the previous two years this had been worse and had been accompanied by expectoration of large amount of offensive sputum. This amounted to nearly a pint of sputum a day. It was usually yellowish green and occasionally streaked with blood. There had been no active hemorrhage. There was no pain. Appetite was good. The patient had learned to empty himself of sputum by bending over. Coughing started the flow, which continued until the patient was emptied.

Patient had been treated about a year previously in the Jewish Hospital by Dr. Sale, who made a pneumothorax on the left side. He received no benefit from this treatment and stated that he felt worse as a result of it, because since then he had had pain in his chest. He had spent several months in Colorado without beneficial result. His sputum had been examined repeatedly for tubercle bacilli with negative results.

He had measles at five years of age and whooping cough at six. There was no evidence of pneumonia at the time of the onset of the chronic cough, beginning at the age of two.

Examination showed a fairly well nourished, somewhat cyanotic, patient, who weighed 131.5 pounds. Height, 5 feet 9¾ inches. Stooped shoulders, listless expression, marked clubbing of the fingers and toes, prominent mammary glands, offensive breath and a slight asymmetry of the chest.

Examination of the chest showed the left side flattened, with limited expansion. The left clavicle was slightly more prominent. The chest circumference on the left side was 71.25 inches; right side, 18 inches. Expansion was 1 inch. Tactile fremitus decreased on the entire left side. Dullness was present over the left lower lobe. The heart was displaced somewhat to the left. There were no murmurs, but a slight sinus arrhythmia. Blood pressure was 110/65. The liver was slightly palpable in the epigastrium. Reflexes were all present. Wassermann reaction was negative. Temperature was 98.2°; pulse, 80; and respirations, 18. Hemoglobin, 90%; red cells, 5,040,000; and leucocytes, 9,580. The urine was normal. The electrocardiogram was normal. X-ray plates showed an extensive infiltration of the left lung toward the base, with displacement of the heart to the left. An area of pneumothorax was seen in the left apex.

November 6, 1920, the first stage operation was carried out. About five inches of each of the seventh, eighth and ninth ribs were resected on the left side from the angles to the mammary line. The corresponding intercostal bundles were excised. The pleura was noticeably thickened and

was not opened. First stage terminated after closing the skin with silk-worm and silk, without drainage. No marked reaction to first stage followed, but there was elevation of temperature 1°, and a faint trace of albumin in the urine with a few hyalin and granular casts. Healing followed by primary intention.

On November 22 the old flap was turned up, the pleura was opened, with little change in the respiration at first. Adhesions between the upper lobe and the chest wall were so delicate that separation occurred on introduction of a finger into the pleural cavity. The pleura was about half an inch thick. Extensive adhesions were present between the diaphragm and the lung. The lower lobe was dark, firm and nodular. Adhesions existed between the lung and diaphragm and the chest wall and were broken up with a finger. Gauze soaked in vaselin was packed about the lower lobe. There the second stage terminated. The reaction was more severe after the second stage than after the first. The temperature on the following day was 101°, pulse 110, and respiration 22. There was considerable discharge of bloody serum.

On the sixth post-operative day the packing from the chest was removed under nitrous oxid anesthesia and three Carrel tubes were placed for irrigation with Dakin solution. The temperature continued elevated, reaching a height of 104° until the ninth post-operative day (December 1), when it fell to practically normal, and remained so until the third stage of the operation. On December 14 his weight was 117 pounds. The cavity remained clean after the first two or three days with irrigation with the Dakin solution; and on December 31 the third stage was carried out. With nitrous oxid anesthesia the old incision was reopened and the lung was found to have retracted upward somewhat. In order to provide more space, about 4 inches of each of the fifth and sixth ribs were removed. The lower lobe was found to be densely adherent all around. Many adhesions had to be cut. The greatest difficulty was experienced in separating the adhesions between the lung and the diaphragm. The separation between the upper and middle lobes was easy. Curved clamps were placed on the hilus and the lobe was amputated. The clamps were left in position. The wound was packed with vaselin gauze and covered with several pads to exclude air. The operation was well tolerated and lasted 45 minutes. On January 3 the clamps were removed from the hilus without bleeding and with no evidence of bronchial fistula. There had been very little reaction to this stage of the operation. The maximum temperature was 102°, with an average of about 100°. The average pulse rate was 130. Respiration was 25. There was no cough. Dakin irrigations were continued regularly from the time of the removal of the clamps.

On January 8, for first time the patient tasted Dakin's solution and began to cough during irrigation. On January 10 a bronchial fistula was observed. Instead of ordinary Dakin's irrigations, one irrigation per day was substituted with the patient in a sitting posture with care to avoid entrance of fluid into the fistula. Recovery was practically uneventful except for an attack of acute tonsillitis.

He was discharged from the hospital on February 19, 1921, with a bronchial fistula about the size of a lead pencil. This healed entirely spontaneously about two months later. It has remained healed ever since. There has been practically no cough since the operation, and the patient is now able to work for the first time in about three years.

SUMMARY

The treatment of bronchiectasis has always been unsatisfactory. Certain cases of recent origin respond to the comparatively simple procedure of artificial pneumothorax and are made free from symptoms. In some cases a foreign body is present which should be removed. Radical surgery should probably not be attempted until after less radical measures have been tried. There are certain cases in which satisfactory results can be obtained only by radical means. Pneumotomy with simple incision and drainage of the cavities has generally proven unsatisfactory. The most rational radical measure is lobectomy when the process is confined to a single lobe. The fourth case in which lobectomy has been performed with an entirely satisfactory result is here described.

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DISCUSSION

Dr. J. J. Singer, St. Louis, Mo.—This disease is primarily a medical condition, becoming surgical either as a result of ulceration or through the effort of the surgeon to relieve the effects of bronchiectasis. The acute forms noted in the last epidemic of influenza were relatively rare before that time. The type of cases under discussion, that is, surgical bronchiectasis, are those in which the bronchi are more or less fibrous with dense adhesions to the pleura as the result of poor evacua-

tion of the purulent contents. Putrefaction occurs and a vile odor results which makes the patient very uncomfortable and renders life unbearable for him and his neighbors. Most of these patients do not suffer physical pain or physical discomfort. After the course of many years, having tried every method, in desperation they come to secure surgical relief. The well drained cases will seldom submit to the operation, which up to date has had such a high mortality.

This brings about the two types to be discussed: the medical and the surgical. There is no known medicine or treatment which will in any way eliminate the cough or the amount of secretion, and the discharge from the cavity depends very much upon the size of the lesion. Postural drainage has been recommended and used with great success. This, of course, is only palliative and at best gives very little beneficial result. The patient will empty his cavities much more quickly and with less effort by the bronchoscopic treatment, by cleaning out the cavities under direct illumination, as recommended by Yankauer and others, but this method is not very popular in our locality. It is possible that with more highly trained operators in this field, more cases will submit to this method. Pneumothorax, or compression of the lung, in one-sided bronchiectasis gives some dramatic results. In this connection I wish briefly to discuss a case of bronchiectasis.

Following an attack of influenza three years ago, this patient brought up 500 to 1000 c. c. of thick, purulent material in twenty-four hours without odor, with considerable effort and much strangulation. Lying in bed was impossible on account of the cough. However, the patient did very well, with the exception of two or three attacks of fever, for two years. The fever was at first thought to be due to the inflammation of the bronchi, but it was later proven that a frontal sinusitis was responsible for it. Appropriate treatment was applied to the sinus, which decreased the temperature but did not affect the bronchiectatic secretion. Two years after the onset, the patient developed three severe hemorrhages and pneumothorax was decided upon. After two fillings of the chest cavity the cough practically ceased and the discharge was not over a teaspoonful a day. It is now six months since I began this treatment and the patient has gained sixty-five pounds, almost doubling her weight. She is also able to sleep lying down and has no discomfort other than that of having the pneumothorax repeated every three or four weeks. I am not in a position to suggest how long it will take to keep this lung collapsed, but in all probability it will be safe to use the treatment for many years. Other cases do not do so well as this one on account of the dense adhesions to the pleura. This photograph (indicating) will demonstrate the condition of pneumothorax with a complete collapse.

Bronchiectasis in both lungs, of course, will not lend itself to this treatment so well. The case Dr. Graham discussed was one in which the pneumothorax was done with no benefit. The foul odor which trailed this man made him *persona non grata* with his family and himself and led him to beg for an operation. This operation was refused him by many men in various parts of the country. I called Dr. Graham into consultation, explained the situation to him, and the result speaks for itself.

As a medical interpreter of chest conditions, I feel that every case of bronchiectasis, after careful study and after all other available methods have been tried, should be subjected to an operation, and I believe that with the technic that has been used in recent years the mortality of this operation will greatly decrease.

In the case Dr. Graham described we did not obtain good results from pneumothorax. The sputum kept coming as before and with as vile an odor as before. I saw the boy at the age of twelve and when he returned a few years later he had traveled all over the West and had offered himself to surgeon after surgeon for relief. He had offered himself to us originally, but at that time the sputum was not vile. We put it up to him plainly that the chances were two to one of his dying, and he said he was willing to take the chance. The other case looked as if we would get the same results, but unfortunately he died of complications. When complications are likely to result I think everything else should be attempted, pneumothorax and drainage, before the more severe operation of lobectomy is done.

Dr. C. A. Hedblom, Rochester, Minn.—After hearing Dr. Graham's resume of results thus far achieved, I think we must all agree that the surgical treatment of bronchiectasis has to the present time been anything but successful. The treatment has remained for the most part medical, not because it has been more beneficial but because it has been considered at least harmless. But there is yet a great deal to be learned concerning bronchiectasis and its treatment. If in what I have to say I seem to differ in any particular with Dr. Graham it will be largely upon definition. He has outlined the treatment in a case typical of advanced bronchiectasis. I should like to take a wider viewpoint and consider all cases diagnosed bronchiectasis clinically.

Differential diagnosis as intimated by the essayist may be exceedingly difficult. The cough and sputum are characteristic of pulmonary abscess, empyema with bronchial fistula and of some cases of bronchitis and tuberculosis, and bronchiectasis may be secondary to any of these conditions. At the Mayo Clinic there was no known etiology in 40 per cent of four hundred cases. In fifty-six of three hundred and eighty cases the x-ray ex-

amination was entirely negative. In about 33 per cent the diagnosis was indeterminate as to the extent of the lesion and as to whether or not the other side was involved. Twenty-five per cent were diagnosed bilateral bronchiectasis.

The treatment in cases of bilateral bronchiectasis and those in which localization is indeterminate must necessarily be in the main palliative and expectant. But in the cases of unilateral involvement, especially if limited to one lobe, surgery I believe will eventually be able to offer a very fair prospect of marked relief, if not cure.

I am very glad to have the opportunity to endorse what Dr. Graham has said in advocating surgical intervention in properly selected cases.

The principles of surgical treatment consist in the elimination of the etiological factors such as a foreign body in a bronchus early in the disease; dilation of a stenosed bronchus secondary to a foreign body, thereby securing drainage enough through the bronchial tree; drainage through the chest wall in cases of localized bronchiectasis with large cavity formation, especially in the presence of acute infection characterized by fever and very foul sputum. Some cases are greatly benefited by such drainage. The procedure may in some instances be life saving. Drainage operation has been greatly discredited because it has been misdirected. To attempt to drain a lung, riddled with cavitations, by one small opening is of course utterly futile. Some cases are markedly benefited at least for a time by pneumothorax therapy. This method deserves a trial, particularly in early cases in which localization is uncertain. Plastic collapse of the chest wall has, in my opinion, a very distinct field in the treatment of bronchiectasis. It will produce marked collapse of the lung in early cases. It has been discredited because of the high mortality, but that is not a valid objection in principle, as the mortality can be greatly reduced by doing the plastic operation in stages, preferably under local or combined anesthesia. Lobectomy because of its high mortality to the present time should be reserved for selected cases and in my opinion should follow a preliminary plastic operation. The plastic collapse may be sufficient to effect a cure or such marked improvement that a formidable extirpation is no longer indicated. If such is not the case, the plastic operation constitutes a preparation for lobectomy.

What I wish especially to emphasize is that bronchiectasis varies pathologically as to extent and degree and that surgical treatment should be conservative and should be adapted to the individual case.

Dr. Graham (closing).—Certainly one should hesitate to recommend the really radical procedure of lobectomy until more conservative methods have been tried. That goes without saying. I cannot help feeling that lobectomy will, in the future, become a fairly safe operation and I wish to bring out that so far as a final cure is concerned, meaning absence of bronchial fistula, etc., lobectomy is the only chance of complete success. It must be reserved for properly selected cases.

SPINAL ANESTHESIA*

By J. R. Garner, M.D.,
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The subject of spinal anesthesia should be of great interest to all surgeons, but particularly to railroad surgeons, for reasons that will be touched upon later.

As early as 1888, Corning injected small amounts of a 3 per cent solution of cocain between the spinous processes of the lower dorsal vertebrae, but was careful not to enter the arachnoid cavity. Ten years later (1898) Sicard injected normal salt solution into the sub-arachnoid space and followed his first experiments by similarly injecting morphin solutions. In 1894, Corning had suggested that cocain might be used in this manner to produce surgical anesthesia, but no report of actual experiments along this line was made until 1899, when Bier reported the effects produced upon himself and several of his patients by the lumbar injection of 2 c. c. of a 1 per cent cocain solution in distilled water. On October 26, of that same year, the first surgical operation to be performed in America under spinal anesthesia was done in New York by Tait and Coglieri.

Like every innovation, spinal anesthesia has found its champions and antagonists. Some have gone so far as to advocate its absolute abolishment. Many who met with disappointments in their early experiences discarded the procedure. However, those who have seen the great advantages offered in at least certain classes of cases have held to their convictions until time has proven that spinal anesthesia, properly superinduced with the use of carefully selected agencies, is as safe in all cases as, and a great deal safer in many cases than, inhalation anesthesia.

Owing to its great toxicity, cocain was early abandoned in the production of spinal anesthesia and beta-eucain, alypin, tropococain, novocain, apothesin and stovain each successively was tried. At

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present novocain or apothesin and stovain alone remain in use. As compared with cocain the toxicity of these is one-seventh for novocain or apothesin and one-sixth for stovain. While it seems from this that stovain is slightly more toxic, novocain or apothesin have not generally been found to produce so uniform and satisfactory an anesthesia as does stovain. I know surgeons who have tried novocain with unsuccessful anesthetic effects and become so prejudiced against spinal anesthesia that they cannot be induced again to try it, though they have seen successful cases under stovain in the hands of others.

Stovain having been proven by far the most satisfactory agent at our command, I use it entirely in the production of spinal anesthesias and will, therefore, deal with that drug alone in my further consideration of this subject.

Stovain is a synthetic product the discovery of which is attributed to E. Fourneau. Its anesthetic action equals that of cocain, which is six times more toxic. When injected into the tissues it produces an absolute insensibility to pain, but does not induce any vascular contraction. It evidences a decided cardiotonic action on the myocardium, which attribute should strongly recommend it to the railroad surgeon who is often called upon not only to minimize the production of additional shock, but to combat shock which is already existing, and also at times finds it necessary to operate upon injured persons who, owing to some existing heart trouble, could not be given a general anesthetic with safety.

While stovain may be injected into the spinal canal in doses as high as 0.12 G., it has never been found necessary in my experience to exceed 0.05 G. for any operation.

Spinal anesthesia was first advocated only for operations below the umbilicus, but with the use of stovain any operation below the costal border may be quite safely undertaken. My personal experience covers seventy-three cases, including reduction of fractures of the lower extremity, open operations for fractures of the lower extremity, amputations, hemorrhoidal operations, herniotomies, appendectomies, cholecystectomies, salpingectomies, hysterectomies, various intestinal operations and spina bifida. In every case, anesthesia has been complete and satisfactory, muscular relaxation has been more profound than is often the case under inhalation narcosis, the after-shock was reduced to a minimum and post-operative vomiting was absent.

While stovain is procurable in ampoules prepared under several formulae, only two are of practical use. These are the Barker, or heavy formula, and the Babcock, or light. The Barker formula is as follows:

Stovain	0.05 G.
Glucose	0.05 G.
Distilled water	2.00 c. c.

The Babcock formula is:

Stovain	0.08 G.
Acid lactic	0.02 G.
Absolute alcohol	0.2 G.
Distilled water	q. s. ad 2.00 c. c.

Of these formulae the surgeon should choose the one best adapted to the individual case to be operated upon. The Barker formula, having the addition of glucose, is of a heavier specific gravity than the cerebro-spinal fluid. Immediately upon injection it descends into the most dependent portion of the spinal canal and by this means the surgeon has absolute control of the area to be anesthetized. If it is administered in a sitting posture and the patient is allowed to maintain this position, the anesthesia will be limited to the perineum and anus, while the lumbar plexus will retain its full sense of feeling. Unilateral anesthesia may be obtained by placing the patient upon one side with the shoulders and pelvis raised.

The height to which the anesthesia is produced with the Barker formula is controlled by lowering the patient's head for from two to eight minutes until the desired height is attained, when the head is raised. The advantages of this formula in operations upon the gall-bladder region and upper abdominal viscera can be readily appreciated in that the operation is done with the patient's body inclined so that the head is higher than the feet: the viscera thus gravitating downward from the seat of operation.

Exactly the opposite phenomena is manifested when the Babcock or light formula is used. This solution, being of a lighter specific gravity than the cerebrospinal fluid, rises immediately upon injection and care must be maintained to prevent its rise to a height where its action would embarrass respiration. As soon as the anesthetic effect has reached sufficiently high, the patient must be placed in the Trendelenburg position to carry the stovain solution into the lower portion of the spinal canal. The patient is then ready for the incision. For this reason the Babcock formula is preferable in operations upon the pelvic organs.

The surgeon should not confine himself to either of these formulae, but should select the one best suited in each individual case. He should bear in mind during the operation which formula has been used, for lowering the head in a patient having received the Barker formula or raising the head in one having been given the Babcock formula may lead to great embarrassment to the surgeon and serious consequences to the patient.

As stated, the height to which the anesthetic effect is carried is controlled entirely by the position of the patient. Therefore, the injection is preferably made in the fourth lumbar interspace, the technic being as follows:

The patient is prepared as for ether anesthesia except that in place of the customary hypodermic injection of 1/8 to 1/4 grain of morphin, I prefer a hypodermic of morphin, hyoscin and cactoid. The requisite equipment is a Luer syringe of 2 c. c. and one of 5 c. c. capacity, an ordinary hypodermic needle and a spinal puncture needle with stylet, a 5 per cent solution of novocain and ampoules of stovain solution. All these should be thoroughly sterilized in advance.

The patient is seated upon the side of the table with the feet hanging down, the back well flexed and the head resting upon the shoulder of an attendant or nurse. An assistant who has been delegated to give the injection and watch the patient now selects the fourth lumbar interspace, applies tincture of iodin to the skin and then with a small syringe and ordinary hypodermic needle infiltrates the skin and muscles with 5 per cent solution of novocain. The spinal puncture needle is then painlessly inserted as for ordinary lumbar puncture. As soon as the spinal canal is entered the stylet is removed and about 2 c. c. of the cerebrospinal fluid is allowed to escape. The 5 c. c. syringe, into which has been previously drawn the stovain solution, is now fitted to the spinal puncture needle and the injection rapidly made. In order to make sure that the full dosage is received by the patient, it is well now to partially withdraw the plunger, allowing 2 or 3 c. c. of the cerebrospinal fluid to enter the syringe and then pressing in the plunger to reinject it, thus washing all of the stovain solution from the barrel of the syringe and the needle itself. The needle is now withdrawn and the point of puncture covered. The patient is placed upon his back and the head either lowered or raised about four inches, according to the formula which has been used.

The final preparation of the operative field is now made with as little delay as possible.

With the usual dosage of 0.05 G. of stovain, a complete anesthesia as high as the umbilicus is obtained in about five minutes and as high as the lower ribs in from seven to eight minutes. This anesthesia lasts for a period of from forty-five minutes to two hours, with a safe average of one hour. As soon as the desired height has been reached the head is either raised or lowered in accordance with the formula of stovain used and the patient is ready for the operation.

The various phenomena accompanying spinal anesthesia by use of stovain are as follows:

Heart's Action.—Immediately after injection the sphygmomanometer will indicate a slight fall in blood pressure and the pulse action will be slowed eight or ten beats per minute. However, stovain exercises a tonic action upon the heart and, therefore, the cardiac rhythm is regulated and the myocardium preserves an increased energy.

Respiration.—If the anesthesia has been properly guarded and kept below the

costal margin, there will be no effect upon respiration. Should the assistant in charge of the anesthetic note the respiration becoming difficult or shallow, the patient's head and shoulders are either raised or lowered as he has been given the Barker or the Babcock formula.

Kidneys.—No effect is produced upon the kidneys by stovain. In fact, it is the safest anesthetic to use in the case of a nephritic coming to operation, as it does not seem to increase the amount of albumin in even well-marked cases.

Sweating.—Sweating is frequently not noted at all and when present is far less than under ether narcosis.

Shock.—Not only do patients operated upon under stovain spinal anesthesia manifest a notable lack of shock, but cases already in shock generally show a marked improvement. So noticeable has been this improvement in shocked patients that some surgeons advocate the administration of stovain intra-spinously in that class of crushing injuries to the lower extremities with which we, as railroad surgeons, are so familiar. This they do before undertaking any dressing of the injury, and if later amputation or other operation is required, the patient has not only reacted from his shock, but is completely anesthetized in the region involved.

Nausea and Vomiting.—Though some writers have reported occasional cases of vomiting during the progress of the operation, I have not noted such a condition in any of my cases. A few patients have complained of nausea, especially in abdominal operations when pressure is exerted upon the stomach or diaphragm or when there has been much handling of the intestines. This has generally passed away or been controlled by bathing the patient's forehead, face and neck with ice water and allowing small lumps of ice to melt in his mouth. With the termination of the operation the nausea is generally gone.

Muscular Relaxation.—The relaxation of muscles in the anesthetized area is absolute. This condition is seldom obtained with an ether or chloroform anesthesia kept within the bounds of safety. One has but to attempt the reduction of a fractured femur under spinal anesthesia induced by stovain to note the greater amount of muscular relaxation as compared with that of the general anesthetic with which we are all so familiar.

Post-Operative Phenomena.—The absence of post-operative nausea and vomiting is most noteworthy. A very few cases of post-operative vomiting are reported, but I have never seen one. The patient is saved that uncomfortable period of reaction following ether narcosis. Abdominal distension is frequently entirely absent and always markedly less than in cases operated upon under ether. The pain is much less intense and more easily controlled. The patient is rational throughout or at least only drowsy from the opiate administered before operation. So far I have not found it necessary to catheterize any patient and while I have been told of cases of post-operative incontinence of urine, I have never seen one in my own experience. Occasionally the patient will complain of a slight headache during the day of operation.

If the Barker or heavy formula has been used, the head of the bed should be raised during the first eight to twelve hours after operation, and the foot of the bed is raised where the Babcock or light formula has been used. This will prevent the headache in most patients and at the same time eliminate any slight danger that may remain from the stovain solution's action upon the respiratory nerves.

In presenting to you the subject of stovain spinal anesthesia I realize that it is a subject with which probably only a few have had actual experience. Many condemn it when faulty technic upon their part may be and probably is responsible for their failure. Any surgeon who will try spinal anesthesia, using stovain as the medium of producing it, and following the technic above outlined, will find five points to recommend it over inhalation anesthesia:

(1) Ease and rapidity of administration.

(2) Minimizing of surgical shock and marked amelioration of any existing shock.

(3) Marked safety over gas-oxygen, ether or chloroform anesthesia in cases showing cardiac, renal or pulmonary lesions and in cases already in shock.

(4) Absence of many of the disagreeable post-operative symptoms generally following the administration of a general anesthetic.

(5) Last, but not least, a most grateful patient.

Candler Annex.

DISCUSSION

Dr. W. W. Harper, Selma, Ala.—During the late war our unit was located for a while in Paris near a French military hospital. I went over twice a week to see that wizard of surgery, Shutro, operate. He did a great many hernia operations, all under spinal anesthesia. He used novocain solution with adrenalin. He made all the injections in the mid-dorsal region, and had no bad results. I have seen Shutro operate with no one to assist him but a nurse, do the preparation and make the intra-spinal injection himself with the patient on the table in a sitting posture. Then he operated and it was knife-and-fork surgery. His finger did not touch the wound. It looked like a text book description. I have seen him do four operations an hour. He got beautiful results.

Dr. Cushing has shown absolutely that in crushing injuries the shock is greater in the lower than in the upper extremities. He makes this statement: that injuries should be operated upon immediately; for every movement of the patient, whether by himself or by others, is adding to his shock and the sooner a limb is amputated the better the chances to recover. He says that those patients who die under amputation operations would have died anyhow while waiting to react from the shock.

The shock will not be further increased if we use spinal anesthesia. We have blocked off things and the patient's shock if anything is lessened.

I wish to bring out one point about the Doctor's preparation. If you are going to use glucose, you cannot use ordinary glucose. It will not stand boiling. During the boiling, acid is generated which is extremely irritating to the tissues, especially the tissues of the spinal cord. You should use Merck's C. P. dextrose. This is stable and does not irritate the tissues. As was brought out, the shoulders of the patient must be elevated, for otherwise any fluid runs to the cervical region and you will have a funeral.

One of the most interesting cases I had of spinal anesthesia was a gentleman fifty years old whom I was called to see one morning. He had symptoms of stricture of the bowel. The attendant had given half a pint or a pint, more or less, of castor oil and probably a pint of Epsom salt and enemas all during the night, with no beneficial results. I gave enema after enema until we had a wash tub full of water, but there was no passage of gas or fecal material. I brought him in to the hospital and decided to operate under spinal anesthesia. We gave the injections, injecting into the lumbar region. The operating room was next to the patient's room, and, wanting to hurry things along, I picked the man up and started with him to the operating room. When I got about half way things began to relax and there was a stream all over the floor, all over me, and everywhere else. I stopped in the middle of the operating room, turned around, brought the patient back and put him in bed and there allowed the operation to be completed.

Dr. Garner (closing).—Dr. Harper speaks of novocain and adrenalin's being used. I have seen doctors inject novocain and obtain an incomplete anesthetic effect. Why that should be I do not know. I have seen cases where the patient suffered a good deal of pain following a novocain injection and where they have had to fall back upon general anesthesia to complete the operation. I have seen that follow in only one case where stovain was used. It was afterward found that the formula was improperly made. It was a recent formula that I think was made on special order for some one in Atlanta. They took the figures as shown to be percentage instead of the gram formula and it did not give enough stovain to produce anesthesia.

Speaking of the ordinary glucose, I find that you can obtain ampoules put up by houses which use the proper drugs. They are already sterilized and there is no reason to bother with the mixing of your percentages, with the chance of using improper glucose or other ingredients.

PROSTATECTOMY: PRE- AND POST-OPERATIVE TREATMENT*

BY RAYMOND THOMPSON, M.D.,
Charlotte, N. C.

The indication for prostatectomy is hypertrophy of the prostate gland sufficient to produce an obstruction to the normal emptying of the bladder.

A large percentage of cases have a marked hypertrophy of the prostate gland which produces only slight obstruction or retention of urine, but causes many well-known troublesome symptoms. As a rule, these patients, if subjected to prostatectomy, may be operated upon safely without any special pre-operative treatment. All patients, after careful cystoscopic ex-

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amination, should become accustomed to instrumentation before operation by daily catheterization and irrigation. The type of case requiring special pre-operative treatment is that which has a large amount of residual urine, for instance, from six ounces to complete retention.

PRE-OPERATIVE TREATMENT

The first treatment is the institution of proper drainage. The plan of drainage during the first few days should be a gradual reduction of the residual urine by intermittent catheterization. After the residual urine has been reduced to a point where one can safely leave the bladder empty, it is best to institute continuous drainage. This can be accomplished by a retention catheter in the urethra or by a suprapubic cystotomy. Deaver says that suprapubic drainage of the bladder should not be employed as a routine preparatory measure in prostatectomy, but only in those cases where satisfactory drainage cannot be obtained through the urethra by means of a catheter.

The consensus of opinion of the advocates of the two-stage suprapubic operation is that drainage of the bladder is better accomplished by a suprapubic cystotomy. Urologists, who prefer the perineal route, believe that the same results can be obtained by draining the bladder by means of the retention catheter. The bladder should be irrigated daily with a warm sterile solution of boric acid, physiological salt solution or water.

As a genito-urinary antiseptic, hexamethylenamin (20 to 30 gr.) daily is given in conjunction with acid sodium phosphate during the first few days of preparatory treatment. Young advocates much larger doses (60 to 90 gr.). Large quantities of water should be given to patients in this stage of preparation. Later on, alkalinization of the tissues is a valuable aid in those cases with infection.

THE CARDINAL PROGNOSTIC POINTS

In order to tell whether or not a patient is able to undergo prostatectomy and when to operate, it is necessary to study carefully the following clinical and laboratory features: general clinical appearance, functional renal test ('phthalein), blood chemistry, blood pressure, and infection.

General Clinical Appearance.—A careful physical examination should always be made in addition to the usual urological examinations. Heart disease with failing compensation and arteriosclerosis are contraindications for operation.

In cases of cardiac insufficiency, digitalis should always be given several days before operation. The patient from a general clinical standpoint should be physically fit for a major operation under local or general anesthesia. In malignant cases, radium and x-ray should be administered during the pre-operative management as well as after operation.

Functional Renal Test.—Renal function as indicated by 'phthalein excretion should be as near normal as possible, and at least two or more successive functional tests should show practically the same percentage of 'phthalein excretion. It is important to draw a distinction between intramuscular and intravenous administration of the dye as has been plainly demonstrated by Braasch and Kendall. Renal function is best estimated after intravenous injection, while intramuscular injection indicates the condition of the tissues. In cases of cardiac insufficiency the amount of 'phthalein excreted after intravenous injection is greater than that following intramuscular injection, and the difference may give a good idea of the comparative degree of cardiac insufficiency. Coincident with the institution of drainage and the resultant reaction or infection, the 'phthalein excretion curve declines, showing a subsequent rise as the patient passes through this period.

Blood Chemistry.—For all practical purposes the determination of the non-protein nitrogen and the preformed creatinin are of most value. If the former is well within the limits of normal (25 to 40 mg. per 100 c. c. by the use of the Folin and Wu technic) the latter need not be determined, although as a routine we always make this estimation. An acute nitrogenous retention will be indicated by a rise in the total retained nitrogen long before there is an increase in the creatinin. Creatinin retention denotes chronicity and is of considerable prognostic value. With the presence of the residual urine with back pressure

on the kidneys there is always nitrogenous retention. As the residual is reduced in amount and the patient passes through the drainage stage, the retained nitrogen of the blood decreases, and if there has been no permanent kidney damage it reaches and remains at a normal level. It is usually at this stage that the 'phthalein excretion (after intravenous injection) becomes stabilized at its best figure.

Blood Pressure.—High blood pressure or hypertension is not necessarily a contraindication to prostatectomy. It is, however, a very important guide regarding the time for operation. In a majority of cases the blood pressure drops decidedly immediately following the institution of drainage and continues to decrease until the patient has recovered from the reaction which follows drainage and infection. Prostatectomy should be deferred until the blood pressure rises and reaches a point of stability.

In this connection it would not be amiss to quote verbatim O'Conor's study of blood pressure in a group of 56 cases of urinary retention due to prostatic obstruction, 55 of whom were operated upon.

"It was early noted that patients operated upon at a time when the blood pressure was accompanied by satisfactory renal function showed a post-operative fall in blood pressure greater than seemed normally commensurate with the degree of operative disturbance. This suggested the possibility that we were operating upon these patients without a sufficiently prolonged pre-operative management, despite the fact that their general condition seemed satisfactory and their renal function entirely adequate. After this observation and in order that we might draw conclusions, no patient was operated upon until his blood pressure had maintained a definite level for at least four days."

Infection.—Infection is one of the most important prognostic points. Cases with a large amount of residual urine usually have considerable hydronephrosis and hydro-ureter. When a catheter is introduced, infection immediately follows and frequently spreads to the upper urinary tract. It is very important to prevent infection during the first few days of treatment, as the congestion from withdrawal of the residual urine causes considerable shock, and if infection occurs at this time, the patient may present symptoms of uremia, which are due to an acute pyelonephritis. It is true that infection will certainly follow the institution of drainage which is fortunate for the patients, as they will always develop an immunity before operation. Prostatectomy should always be deferred until it has been demonstrated that infection of the kidneys will not develop.

The time of operation depends upon complete preparation of the patient. The length of time varies greatly. In some cases it is only a few days; in others, many months. Geraghty says if the patient does not improve by drainage he will not be benefited by operation, as removing the prostate gland will do nothing more than give drainage.

POST-OPERATIVE TREATMENT

The post-operative treatment begins immediately on returning the patient to bed. The post-operative cardinal points to be considered are:

Shock, hemorrhage, drainage, fluid intake and fever.

The term post-operative shock is a condition following any major operation which has been frequently described in the literature. Surgeons occasionally have patients who die shortly after or during an operation, the cause of which is indefinite, and we call it shock.

Just a few years ago hemorrhage was considered almost a necessity in prostatic surgery, but by the more recent means of controlling this dreaded complication very few surgeons are troubled with it. The treatment, of course, is to prevent hemorrhage rather than to combat it. This is accomplished by proper ligation and packing.

Proper drainage of the bladder is absolutely necessary to prevent retention of urine and absorption from an infected bladder and surrounding tissues. Septicemia from this focus of infection is easily prevented by thorough drainage. A post-operative rise in temperature is usually due to improper drainage or pulmonary complications.

The administration of fluids following prostatectomy has been recognized for several years as a very important factor. These may be given by mouth, rectum, subcutaneously or intravenously. In many cases, especially those operated upon under local anesthesia, it may not be necessary to

give fluids other than by mouth. In others it is necessary to administer physiological salt solution or glucose and salt solution per rectum, subcutaneously or intravenously. Alkalinization of the tissues is regarded by many surgeons as essential in addition to the increased amount of fluid intake.

Symptoms arising directly referable to the gastro-intestinal tract, respiratory or circulatory systems should be treated as following any major operation.

Epididymitis is a frequent complication and is best treated palliatively by support and local applications.

Patients should be encouraged to sit up and urged to walk around in the hospital from three to five days following operation provided their general physical condition will permit it.

CONCLUSIONS

(1) All patients requiring prostatectomy should have special pre-operative treatment and post-operative care, especially those who have a large amount of residual urine without infection.

(2) Blood pressure readings carefully taken at stated intervals are a valuable guide as to the proper time for operation.

(3) The clinical picture and laboratory findings are of the greatest importance as an index to the patient's condition.

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The Crowell Clinic.

DISCUSSION

Dr. E. G. Ballenger, Atlanta, Ga.—One type is particularly dangerous and requires a little more than the ordinary care and that is the type where there is no infection in the urine, but a large amount of residual. If there is no infection with a large amount of residual the patient fails to develop an immunity and the kidneys are damaged by the continued back pressure. When I first began prostatic work I thought it was an advantage to have the bladder free of infection, but I gradually learned that I was mistaken. I now think those patients with infection, if properly treated and drained, are likely to get along better because of the immunity they have developed. We sometimes see patients in a practically ideal condition for operation who do well until the wound takes on a bad look, due to an infection that they have no immunity against.

A little more stress should be placed upon the alkalinization of the patient. If the kidneys seem to be the weakest point I insist upon alkalinization. If the infection is the worst feature I give hexamethylenamin in large doses. No rule applies in both cases. The alkali cannot be used with the hexamethylenamin. We have first to decide which we fear most and treat the patient accordingly. We have to be very careful in these cases to do the patient the greatest possible amount of good.

Dr. George R. Livermore, Memphis, Tenn.—I am a firm believer in the two-step operation and a prostatectomy. If it makes a poor risk a better one it will make a fair risk a good one. Therefore, it should be done on every case.

By wearing a suprapubic tube the patient vaccinates himself and increases his opsonic index, and thus decreases his chance of infection.

We should never let a patient leave the operating table until we are sure the hemorrhage has been controlled. Many patients die from uremia, so-called, due to loss of blood, which brings on uremia or pneumonia, and they are classed as dying from another cause when it was really hemorrhage. If this had been taken care of at operation they would not have died. I do not care how the hemorrhage is controlled, by ligation, by suture, by packing or by a Pilcher bag, only stop all hemorrhage. You have all seen cases where this was not done. You have had to go in later and take care of the hemorrhage, and when you do this the patient's chances are always diminished.

Alkalinization is a good feature, and in cases of infection is especially indicated.

It is well to get the patients up early, but we should classify them and not get all of them up at any given time. Each patient is a law unto himself.

Dr. H. W. E. Walther, New Orleans, La.—The diet for these patients is usually eliminated in all papers, and yet to me is of extreme importance. We have a good deal of alkali incrustation of our wounds following opening of the bladder, and my investigation into the diet of the patients at the Charity Hospital brought out the very interesting fact that they were fed largely upon carbo-

hydrates and received very little protein. It may be that the protein diet there is so bad they would not eat it. They have an almost exclusive carbohydrate diet and they develop very marked incrustation.

The point that brought this out was Dr. Ballenger's speaking of the alkalinization of the patients. I am of his view, but we have a paradox to deal with in the alkalinization of the patient and the elimination of the incrustation of the wounds. These wounds are very painful. They are sand-papery, and they prevent healing. I have found that since we are giving our patients a better balanced diet we get less incrustation and the wounds heal very much more promptly.

Dr. J. D. Highsmith, Fayetteville, N. C.—When 'phthalein is given intramuscularly the output is an indication of tissue activity. When given intravenously, it is of course a direct index to renal activity.

The point about the careful study of the blood pressure was well taken.

Tissue alkalinization certainly diminishes the occurrence of troublesome hiccoughs, and also uremia.

Dr. John R. Caulk, St. Louis, Mo.—We are all agreed upon the fundamental principles of the preliminary treatment which the essayist has brought out and we realize that it has brought the mortality down to a low percentage over and above any surgical treatment.

We all believe that catheter drainage is the right step with a full bladder rather than the suprapubic. Whether we should let all the urine out at once, or whether we should let it out gradually and do intermittent catheterization, brings much difference of opinion. I have been looking out for this for a long time and have not been able to convince myself that there is such an enormous feature to it. I have seen a bladder holding two quarts emptied immediately without any trouble resulting. We must realize that a distended bladder, unless there is a nerve lesion, has more power or resiliency and "come-back." The bladder that is opened cannot get this. In the one you may maintain the intravesical pressure and in the other you cannot. There is not so much difference whether this be let out at one time or gradually.

I have come to believe a good deal in alkalinization, not only for the bactericidal effect which it has but also for the tissue absorption. We are often fooled about the real capacity by the functional test. There are two things to consider: kidney elimination plus tissue absorption. Many times the kidney that does not look as if it could take care of its work will do so if given a chance. I have been impressed with the great importance of soaking these patients with fluid beforehand, not only by mouth, but by giving them two quarts by hypodermoclysis before operation. I do not like a low blood pressure or one that fluctuates and you will be surprised to find that if you saturate the tissues with fluid you will not have shock and the patient even with low pressure can tolerate a great deal more surgery than if his tissues were not thus stabilized.

Dr. A. I. Folsom, Dallas, Tex.—I prefer drainage by catheter and believe the bug-bear of emptying these bladders is exaggerated and that there is not so much danger as we have been taught to believe. Our custom is to disregard this feature when we empty the bladder.

The suprapubic two-stage operation has been worked overtime in the last few years. It is misunderstood by many men, some thinking that a pre-operative cystotomy makes the time less to get the patient back into good condition. The essayist was fortunate in calling our attention to this mistake. The operation *per se* is not necessary for the safety of the second operation, but it is necessary to get the patient in good condition. It makes no difference whether it takes six weeks, six months or nine months, as it did in one case of mine. We are not justified in operating until the patient is a fair risk, because we cannot do anything by operation that we have not already done by the suprapubic cystotomy. If he cannot "kick back" after the suprapubic cystotomy he certainly cannot after an enucleation of the gland.

There is one very definite objection to suprapubic as compared to urethral catheter drainage, and that is the necessity of operating through the old sinus. I am constantly afraid in these secondary operations of opening the peritoneum, and know of several cases in which this has been done. If you do not open it up under your eye so that you are satisfied about it, but stretch the sinus forcibly, I am constantly afraid of tearing into the peritoneum above. It has been my experience that no matter how far up you stitch your peritoneum in the first suprapubic operation it gets back down to the sinus.

I have found it a very great help in preventing incrustations and in relieving them after they have formed, to instill the lactic acid bacillus solution, as brought out by Dr. Caulk a few years ago. Incrustations not only irritate the wound, but the skin outside the wound, and this solution has a very beneficial effect in preventing and relieving them.

I do not agree with the essayist that these patients should be allowed to get up on the second or third day. This is too early. If we turn them and set them up in bed it serves all the purposes of getting them up. Especially if they have a bad cardio-vascular system it is a distinctly dangerous procedure to get them up too soon.

The question of hemorrhage is one that we have approached from several different angles from the time we did nothing for it until we went into elaborate methods for preventing or overcoming it, such as suturing the capsule with the wide-open bladder. If you close the bladder incision tightly around the tube you will have no trouble with hemorrhage. We encourage hemorrhage frequently by our manipulations.

Dr. J. H. Smith, Memphis, Tenn.—I think we institute drainage in prostatectomy, first, for the relief of back pressure; second, for the relief of inflammatory conditions; third, to increase kidney elimination; fourth, for the removal of calculi; fifth, for the sterilization of the bladder as nearly as possible; and sixth, for the increase of physical

and muscular tone in the patient himself. Generally these patients fall into a systemic infected condition. The majority before having an operation or treatment, before going to a urologist, try numerous other doctors until they do not get the relief they should have and then they seek a urologist for relief. Even then it is difficult to get them into the hospital and in shape for operation. The blood pressure findings should be the guide as to when to operate. In old men with a high blood pressure you must watch out, for you are going to lose them after the second operation. It is difficult to get complete sterilization of the kidney and bladder. The functional output should be another guide for the second operation. When the kidneys are functioning with a fairly normal output for a man of the patient's age, we operate. We scarcely ever run across an indication for prostatectomy in young men. Every case in the aged has more or less arteriosclerosis, and I see no contraindication for prostatectomy in those cases.

It is true in all long-standing infections that the patient himself, or the host, has brought about a large amount of resistance. This condition is much more pronounced in old prostatics than in the acute condition.

Hemorrhage is practically unnecessary. Shock may be the result of hemorrhage and rough manipulation of the tissues.

I cannot agree with the doctor who said that quick evacuation where there has been marked retention is not dangerous. I have lost two cases through immediate evacuation, which I think is synonymous with rough manipulation of the tissues, as a causative agent of shock.

The general surgeons who attempt to do prostatectomies should attend the urological meetings. We are the men who are getting the low mortality. Why? Because the general surgeons do not understand these fundamental points that the essayist and those discussing the paper have brought out. That is the reason they have 40 to 60 per cent mortality while we have 3 to 6 per cent.

Dr. George A. Hendon, Louisville, Ky.—I view this problem from the standpoint of the general surgeon. First, I never could see any excuse for doing a suprapubic prostatectomy. Second, I think any man with ordinary skill will, if he will exercise the proper degree of patience, cleanse the bladder as well by catheter drainage as by opening above or below the pubes. Therefore, if you want to do a prostatectomy and have neither the skill nor time to drain through the urethra, you had better associate with yourself some gentleman who possesses that skill and patience and time. I would not think of opening the bladder to drain any more than I would think of opening every fracture that comes to me to be treated. In making the suprapubic opening you expose the patient to added danger on account of this opening. You can drain him more effectually through six or eight inches of mucous membrane than through a one and one-half inch incision in the abdomen.

If you have hemorrhage it is because you have been careless or unskillful or awkward in your work. That means you have torn into something you had no business to invade.

After you have done the prostatectomy the treatment hinges absolutely upon your drainage. If the drainage is imperfect you will have incrustation and sloughing around your tube. If the drainage is properly carried out there is no such trouble. The drainage that serves me best is the two catheter drainage, one for intake and one for escaping fluid, and I allow the fluid to drain in about the same as with the Murphy drip. The urine is constantly diluted in this way and the toxic elements are largely eliminated.

Dr. Abraham Nelken, New Orleans, La.—Every time I have heard a paper on pre-operative care of prostatectomies it has been my regret that the recently deceased Dr. Freyer was not present.

While unfairly credited with originating suprapubic prostatectomy, certainly the credit for popularizing this procedure belongs to Freyer.

We all believe in the value of the pre-operative tests referred to by the essayist and we all stress the importance of careful study of the operative risk before prostatectomy. Freyer probably paid slight attention to the pre-operative care of his patient, knew nothing about blood chemistry, made no reference to blood pressure, and, in short, disregarded many of the tests upon which more careful operators lay so much stress. Yet I understand that when, at the Mayo Clinic, they compared their statistics on prostatectomies with Freyer's, they found that his figures were better than theirs. When an operator can report over a hundred prostatectomies, which he claims to have been unselected cases, without a death, it certainly arouses our interest. We might be excused for thinking that his skill is only exceeded by his good fortune. The question of hemorrhage about which so much is said gave no uneasiness to Freyer and his followers. They did not pack at all. And the two-stage operation was introduced and popularized by others than by Freyer and his school.

Dr. Louis Frank, Louisville, Ky.—We have gotten away from the title of the paper and into operative method or technic. Whether there is hemorrhage or not really concerns the technic and not the pre-operative and post-operative care of the patient. In reference to the pre-operative care I wish to speak of drainage of the bladder. I am not discussing the patient from the retention standpoint or 'phthalein output with a normal heart, but I am discussing the patient who requires pre-operative care. I am not discussing the patient who has only an obstruction to the outflow of urine. In patients with enormous urinary retention it is a rather dangerous procedure to empty the bladder completely at one sitting, whether done from below or above the pubes. I have unfortunately had a resident physician do this upon one occasion and have seen the patient go out as the result of uremia. It is not a question of emptying the bladder, but of inducing acute renal congestion by sudden relief of back pressure.

What does the essayist do in the way of pre-operative treatment for patients who have a high blood pressure and high blood urea? What is he doing for the patients who are uremic before he operates? From the title of the paper I take it this is the topic to be discussed. We have not felt like making examinations to determine these conditions, going ahead and doing the operation and then attempting to ward off something that might happen. We have our own methods of pre- and post-operative procedures and just what the advantages may be we do not know.

We have, instead of associating with ourselves, in these bad cases, some expert urological surgeon, associated with us expert medical men, believing that they might be able to handle some phases of the cases better than we. We have looked upon diet and output through the skin as of great value. You have all had the same kind of patients which we have. You have had them with uremic vomiting with badly damaged kidneys. How and when are you going to operate upon these patients, and how are you going to carry them through? It is not a question of whether you do a suprapubic or a perineal operation, whether you have hemorrhage or not, how much you irrigate and those things, but a question of the cardio-renal system.

Dr. Jesse Leland Boogher, St. Louis, Mo.—I have concluded that sometimes we take too much pains with our patients.

I personally prefer the perineal operation. I was criticised very severely when I read a paper on bladder drainage and gave several instances in which the bladder had been drained slowly at one sitting.

In one case 113 ounces, or about 3280 c. c., was drained out in five hours, thus giving more muscular strength. That was eight or ten years ago. That man is alive today and is urinating as well as any individual of his years.

This was arrived at because the patient would not have an operation, and he is certainly better off with a fairly good prostate and a good bladder than he could have been if the prostate had been removed.

I think there are many cases where proper treatment of the prostatic trouble gives excellent results. I have not had a death in bladder drainage in over thirty years.

Dr. Thompson (closing).—I tried to eliminate a large class of cases that did not need pre-operative treatment. I tried to dwell upon the cases that have a large amount of residual urine, with or without infection, and to bring out the plan we use in the gradual reduction of the large amount of residual. When the patient reaches the stage where we can safely leave the bladder empty, at that time we can continue drainage either suprapubically, by means of a cystotomy, or by means of a catheter. I include with the clinical picture the laboratory findings as an index to the patient's condition. If there is nitrogenous retention it should be reduced by drainage and fluid intake before operation.

EYE, EAR, NOSE AND THROAT

FURTHER STUDY OF OCULAR MANIFESTATIONS RESULTING FROM FIFTH NERVE IRRITATION*

By E. H. Cary, M.D.,
Dallas, Tex.

Jonathan Wright's opinion of the pathology of specimens of bone presented to him by Sluder is sufficiently clear to be accepted by me in this address. Findings in our own laboratory were confirmatory to the extent that it seems unnecessary to attempt any further pathologic description than that of Dr. Wright. The bones which he describes were different turbinals and parts of spheno-ethmoidal walls. But in this introduction to Sluder's book there is apparently no description of the pathology of the septum, and I find nothing in his book which definitely relates itself to such pathology.

Sluder's study, as I gather it, has been concerned with the pathology of the parts described by Wright, and does not lead him to ascribe many interesting phenomena occurring in the eye, manifestations of which, although often connected with the special phenomena which he has observed, are in my opinion the result of additional inflammatory bone changes which have a relation to the parts he studied. They are certainly inter-related and will explain the view I shall try to uphold, which is founded upon septal, sphenoidal and ethmoidal bone incidences as a basic cause. The parts discussed by Wright I regard as more or less secondary instead of primary in producing many of the interesting reflex eye phenomena. It is well, at the outset, to make it clear that in interpreting the expressions of nasal origin it is likely that certain symptoms are possibly from a predominating zone of chronic inflammation of certain bony areas under consideration.

In a large number of extremely interesting eye cases, the disease being traceable to the nose, I have found that the septum is apparently one of the chief factors in producing a condition not only involving itself, its periosteum and boggy mucous membrane, but the adjoining structures as well, producing chronic inflammatory changes which become the active source of certain nerve irritations that finally lead to these ocular manifestations. Much depends upon the position and the length of the sphenoidal sinus. They vary considerably in form and size, often being partially subdivided by bony lamina. The average measurements of each sinus, according to Alden Turner, are as follows: vertical height, seven-eighths of an inch; the anterior-posterior depth, seven-eighths of an inch, and the transverse breadth, three-fourths of an inch. The sinuses extend laterally into the roots of the great wings and downward into the bases of the pterygoid processes. However, the extent to which either sinus may extend into the pterygoid process varies in different skulls. In many cases one or the other sinuses may pass down into the pterygoid process sufficiently deep to cause a medial bulging of the medial pterygoid plate toward the posterior end of the septum, compromising the posterior nasal opening. The anterior wall of either sinus may be pushed forward into the posterior ethmoidal air cells, thereby causing a medial bulging of the posterior end of the middle turbinate, which lessens the space in that nasal cavity. Occasionally the sphenoidal sinuses communicate with the posterior ethmoidal cells by openings which vary in size and shape.

The septum also spreads out, as it were, making up the anterior wall of the sphenoidal sinus and in this way the posterior end of the middle turbinal is often compromised. This turbinal, when finally inflamed, materially adds pressure in all directions, to the point of pressure necrosis as well as blocking drainage for air or fluids. In the expansion of the ethmoidal cells evidently the result has been a progressive affair, finally pushing the eth-

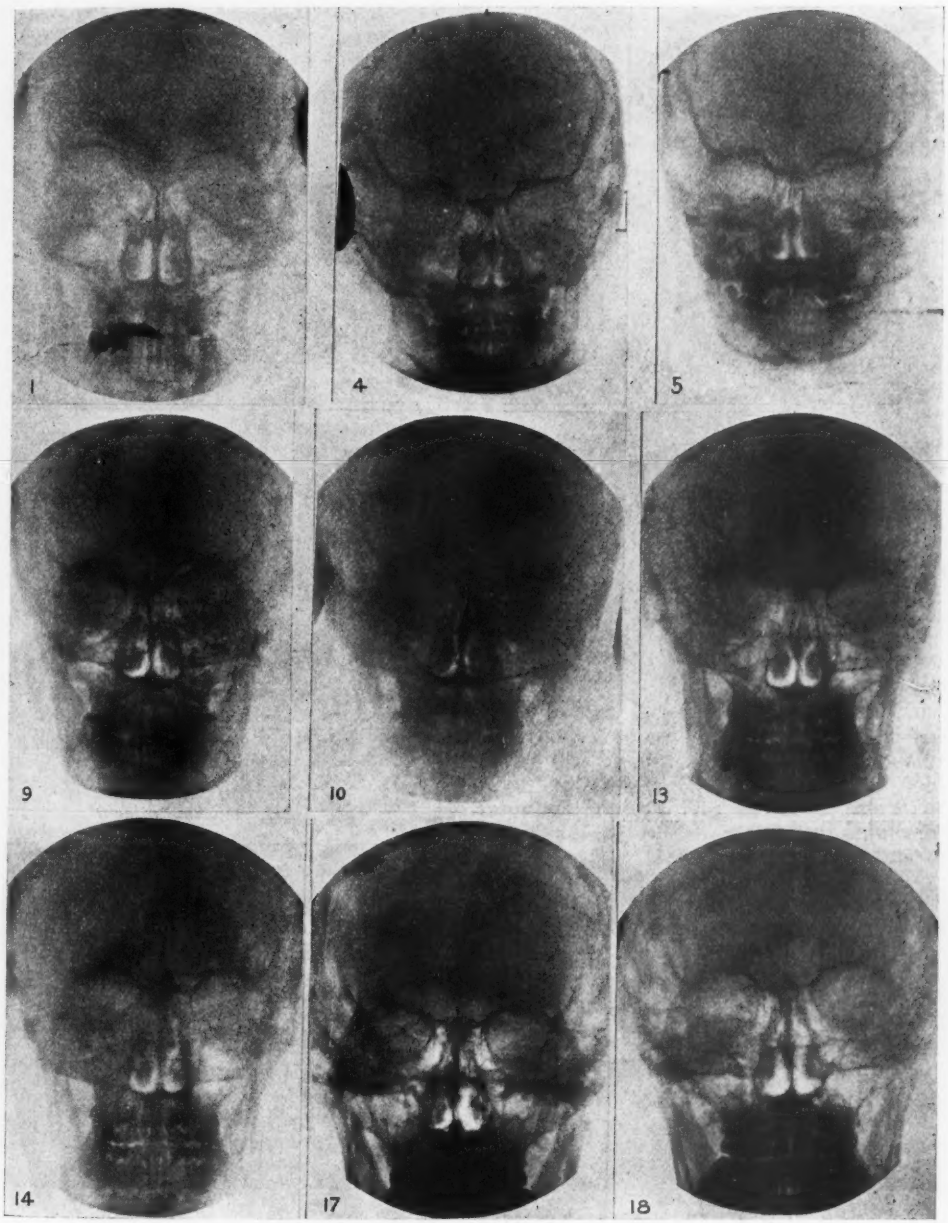
*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Fifteenth Annual Meeting, Hot Springs, Ark., Nov. 14-17, 1921.

moidal wall against the turbinal and this against the septum. The remote expression as we find it in the eye, classified as a disease, for example fascicular keratitis, is definitely an expression of certain localities involved, notably a chronic inflammation of the bony wall of the ethmoid without secretion, a jamming of the turbinal against the septum high up, with frequently an erosion of the mucosa due to pressure necrosis, and chronic osteitis of the surrounding bone of the septum. I have found, for instance, fascicular keratitis the result of a pathology just described, and I have had a similar nasal pathology in many cases where the eye symptoms varied as to the form of keratitis. From the same basic cause follicular changes may occur in the mucous membrane of the eye simulating trachoma, as case Number 1 will demonstrate.

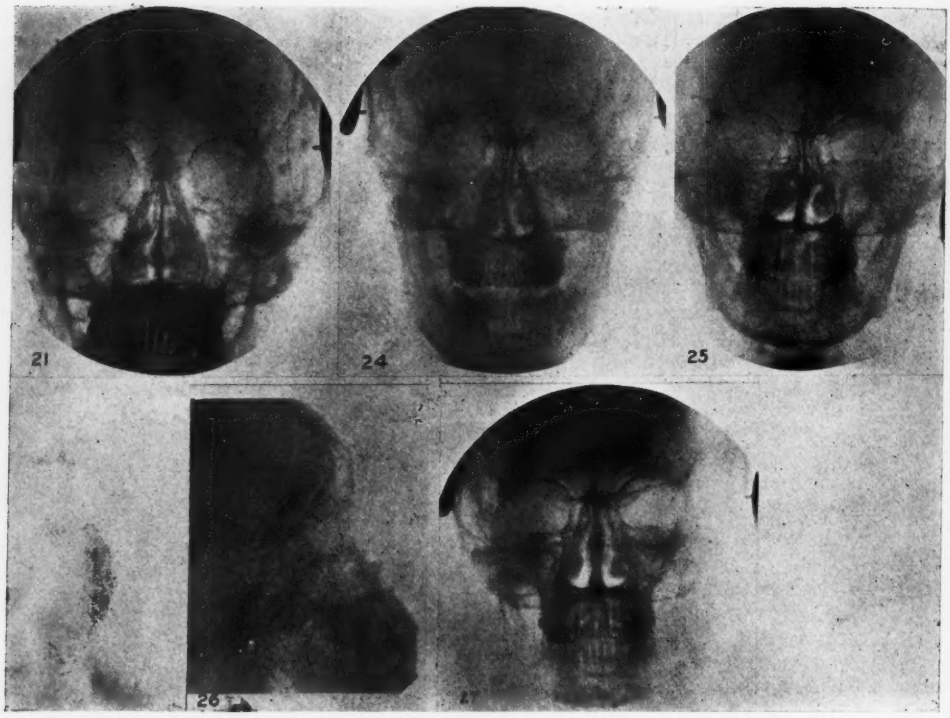
Following this illustration, I shall restate my case by saying that vaso-motor paresis, punctate keratitis, dendritic keratitis (malaria a contributing causal factor in some cases), low grade types of iritis, certain types of interstitial keratitis other than due to hereditary syphilis, as well as many cases of uveitis, so-called hyalitis, vaso-motor disturbances with corneal erosion, even to vernal catarrh (the latter rare and usually complicating certain cases of old trachoma) prove excellent examples. Again, we have changes in the field of vision not altogether characteristic. In one case the temporal half of the eye, many cases of transitory reduction of vision, some cases of functional glaucoma, and herpetic disturbances under certain conditions. These I have been able, after exhaustive analysis, to connect more or less with a pathologic condition of the bony septum, the middle turbinal and the bony wall of the spheno-ethmoidal cavities. Fundamentally, then, I do not find these expressions in the eye occurring in persons with perfectly normal nares. And when we find these conditions an x-ray picture of the anterior-posterior diameter will make it possible for me to point out the parts affected, even though they might not be observable when searching the nasal cavity under ordinary inspection.

To illustrate this, I have selected a few plates with short statements as to what we find in each and what the eye-symptoms in the case were. This group of cases comprises a few out of at least two hundred of more or less similar nature which have been operated upon. It is fair to say that in an examination of several negatives made of individuals without nasal symptomatology I have had difficulty in explaining away the marked similarity in many plates with those whose symptoms were easily traceable. There may be several explanations offered in each plate, but inasmuch as the anatomical arrangement in each case basically changes with conditions, there can be a corresponding increase of tension at certain points, all of which may be the result of inflammation, or simply expansion of ethmoidal sinuses. Many cases may be looked upon as potentially ripe for trouble which only require time and circumstances to develop.

These ocular manifestations are hard to explain and can not be understood without taking into consideration the influence the sympathetic nerve system exerts as a control or accelerator of nervous impulses. It would seem that the most general and best understood function of the sympathetic nerve is its vaso-motor action; and a thorough study of the anatomy of the sympathetic is necessary to understand its functions and possibilities for disorder and the setting up of zones of irritation. The sympathetic can in itself become so involved that it may excite or suppress all impulses, and these distresses may reach the point of disturbed nutrition with corresponding damage. We might elaborate as to the fifth nerve and its many idiosyncrasies. The key, as I understand it, is the recognition of the peculiar appearance of the vascular distress of the eye and the changes which involve the conjunctiva and the cornea, the observation of which will lead you to seek the particular places which might be the seat of the trouble. I could relate specificly cases of extreme interest, involving as I have indicated, all parts of the eye, the pathology of which was understood from its appearance to be the



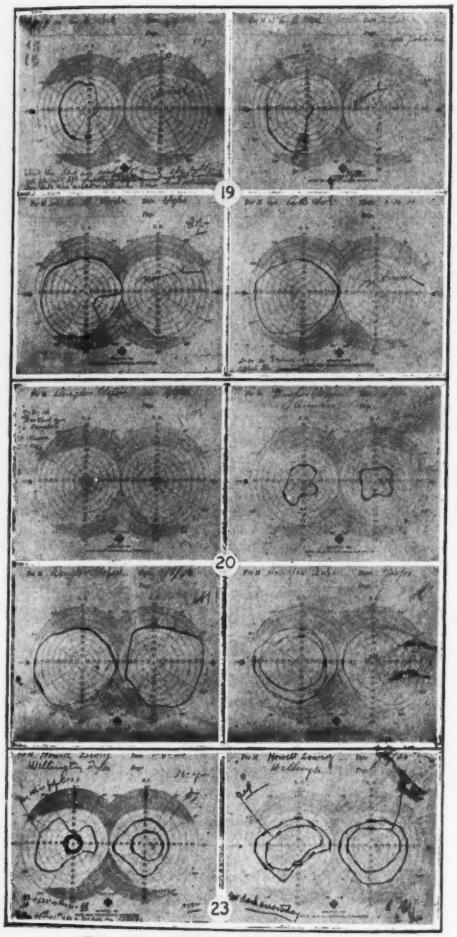
Top row: Fig. 1, Fig. 4 and Fig. 5.
Middle row: Fig. 9, Fig. 10 and Fig. 13.
Bottom row: Fig. 14, Fig. 17 and Fig. 18.



Top row: Fig. 21, Fig. 24 and Fig. 25.
Bottom row: Fig. 26 and Fig. 27.

Fig. 2 and Fig. 3.

Fig. 6 and Fig. 11.



Top (four charts): Fig. 19.
Middle (four charts): Fig. 20.
Bottom (two charts): Fig. 23.

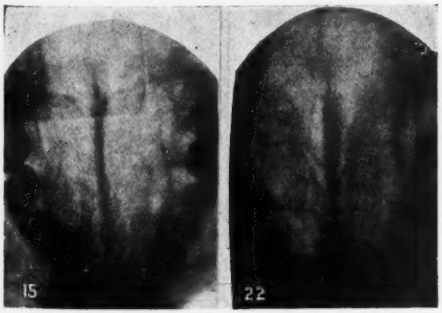


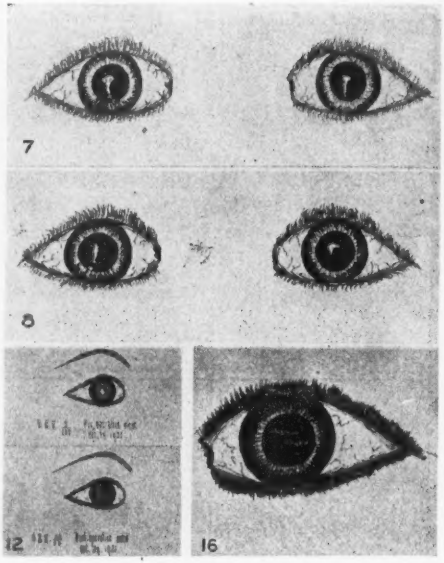
Fig. 15 and Fig. 22

result of certain fifth nerve disturbances: cases that a diagnostician can differentiate and at the same time not allow himself to be misled with the belief that all ocular troubles are the result of nasal irritation.

In 1915 I read in this Section a paper on a similar subject and since have followed this question very closely. I am more than ever convinced that I was in the main right in the conclusions drawn at that time, and that if in any of these cases there is found secretion, it can be stated to be more or less incidental, not in itself a part of the pathologic process which has brought about the reflex phenomena. As a matter of fact, in the most interesting cases, nothing beyond the rarified forms of osteitis are observable. Osteitis is a pathologic condition occurring through pressure from which you have chronic irritation, uncomplicated by bacteriologic invasion. A characteristic thing in most septal involvements is that the periosteum has been separated from the bone, no doubt due to previous serous accumulations; and the mucous membrane and the periosteum are more or less thickened and stand away from the bone, which is abnormal. The explanation can be found in the closing of the ostea of the different sinuses at some previous time, such as an ordinary cold might produce, bringing about more or less pressure, which forms a vacuum in post-ethmoidal sinus. In time this presses forward the ethmoidal wall, aiding in closing the sphenoidal sinus. This starts a chronic irritation of the bone, usually when anterior sphenoidal wall and septum are abnormal, which causes a separation of the periosteum. This physical factor has been the starting point from which successive recurring inflammatory reactions finally culminate in a form of irritation to the terminal filaments of the fifth nerve. This brings about in turn the kind of impulses we might expect to be at first stimulating to the vaso-motor system, yet to be finally exhausting, terminating at intervals in long nutritional disturbances of the distribution of the sympathetic in the eye, yielding the varied phenomena which have been named as certain diseases of the eye.

In a study of the facial structures and the sinuses cutting through the wall of the ethmoid, exposing the internal rectus and the superior oblique muscles of the eye, it can be seen how it is that an insufficiency on the part of the muscles can be established by the proximity of ethmoidal inflammation, for they lie close to this inflamed area, and frequently become involved. The ciliary ganglion which lies near the externus should not be involved. I am inclined to think from clinical study that suppurative inflammation of the ethmoidal cells gives rise to pain in the muscles and not to nutritional disturbance. Yet this should be a matter of degree depending upon presence or predominance of either factor.

Clinically, there are many cases of headaches which have occurred in individuals from the time they have reached puberty or later, and which are not complicated by any inflammations of the eye. We are unable to eliminate the pain in many of the cases by the application of cocain, even when used frequently and placed high up in the nasal cavity. This makes it difficult for you to conclude, through this method of exclusion, that the nose is the real cause. Yet an x-ray picture, anterior and posterior diameter plus an exposure taken in throat below, will show a contact far back, due to greatly enlarged ethmoidal cells and closing sphenoidal sinuses. You must study the x-ray plates and the case with the clinical symptoms before you. You can not depend upon the reading of the x-ray man. It is necessary to make your diagnosis upon showings so slight that without the clinical symptoms they would not be significant. But when this contact is destroyed, the headache will disappear and the patient will be cured.



Top row: Fig. 7.
Middle row: Fig. 8.
Bottom row: Fig. 12 and Fig. 16.

In some cases the removal of the turbinals will seem to be all that is necessary, but after a little while the headache may return. The expanding ethmoidal

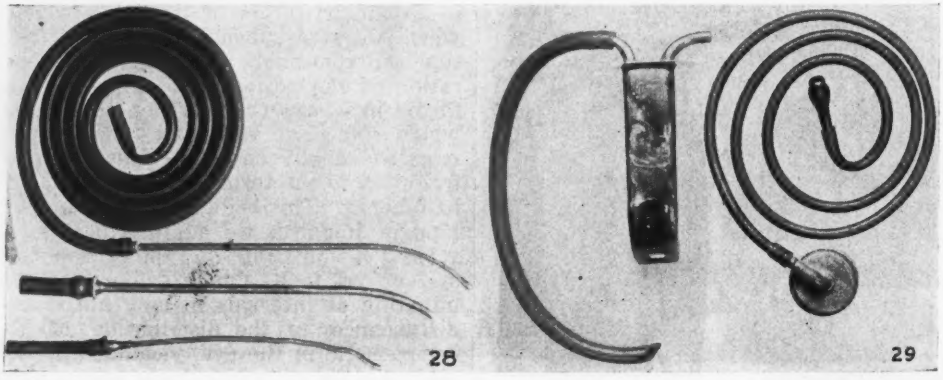


Fig. 28 and Fig. 29.

cells seem to advance the ethmoidal wall, and finally you again have pressure.

The above statement takes into full account the well known headaches, so-called vacuum headaches, as described by Sluder, which are relieved by re-establishing circulation of air in the frontal sinus either through applications or an operation. These cases are very numerous and are well understood.

DESCRIPTIONS OF ILLUSTRATIONS

A selection of pictures from a collection of seventy-five or more, developed in the author's practice, and indicating several valuable points. It is understood that the original films lose in these reproductions, as through the very process of reproduction the outlines become a little indefinite.

Fig. 1.—This might be termed a control case; the picture shows a normal structure without any pathology.

Fig. 2.—E. O. Reflex closure of lids when photograph was made, due to the light in the room and despite the efforts of the photographer to have the child open her eyes; right eye was not involved, but left simulated a well advanced case of trachoma, with extreme pannus, exudates in the cornea, and folliculosis of both lids. There was no vision in the left eye, except to the extent of light perception and hand movements. The lids showed no cicatrices, and this fact with a history of six years of trouble in this eye without involving the other, caused a search for the source of the distress in the child's nasal fossae.

Fig. 3.—E. O. Two weeks after the operation; pannus rapidly disappearing, exudates being absorbed, only a slight photophobia. Vision was returning to the eye, and it was evident the whole eye would clear up as rapidly as an orderly state of resolution would care for it.

Fig. 4.—E. O. Before operation; prominent sphenoidal sinuses, with some density of bony structure on ethmoidal wall, the density of tissue being at the post-ethmoidal space opposite the septum; this was producing chronic irritation of the bony structures of the parts, with practical closure of the sphenoidal sinus on that side.

Fig. 5.—E. O. Two weeks after operation; a later picture would no doubt show even greater changes.

Fig. 6.—Carrie S., 17 years old, troubled with blepharitis marginalis and numerously infected hair follicles from the time she was six years old; three years ago developed an attack of fascicular keratitis which recurred each year.

Fig. 7.—Picture of Carrie S.'s eye condition as it appeared to the artist before the operation.

Fig. 8.—Picture of Carrie S.'s eyes as they appeared after the operation. Keratitis disappearing.

Fig. 9.—Carrie S.'s picture before the operation, showing ethmoidal cells pressing against the ethmoidal walls, and the turbinals pressing against the septum, producing erosion; the bony vomar is greatly thickened around this area.

Fig. 10.—Carrie S.'s picture following the operation; a submucous was first done for the purpose of study; the turbinals are gone, and the bony walls of the ethmoids are pressed away from the septum. Results: The keratitis rapidly disappeared; the chronic passive condition of the lids disappeared, and greatly to my surprise the blepharitis marginalis was relieved, the hair follicles gained strength and the infection disappeared. Almost a year after the operation the girl is free from all the troubles from which she had suffered for so long, and which I had never been able to relieve, although I had given her temporary benefit by local treatments, removing her tonsils, etc. She can now go regularly to school, which had been impossible except at intervals.

Fig. 11.—Minnie L. Interesting case of corneal opacity of the right eye, resulting from keratitis four years ago, which was regarded by the physician she had at that time as a corneal ulcer, and actual cautery was used, leaving an area of scar tissue which can never be removed. Following this she had recurrent trouble with constant pain in and around the eye-ball. After careful analysis, searching the history, I believed the keratitis to be of nasal origin, as well as the eye pain and that the original eye condition did not require cautery. An operation similar to that in the previous case was done.

Fig. 12.—Eye as it appeared to the artist before operation and as it appeared after the operation; the notation of the vision on October 29 is an error, as at that time she got 20/75, reaching 20/50 December 5, 1921.

Fig. 13.—This was an extremely interesting case (Minnie L.), for owing to the length of time she had had the scar, it was difficult to promise results. I found it difficult to convince myself there was any connection between the eye condition and the nose, yet the history of the trouble, the length of time she had the pain, plus the x-ray findings, led me to do the operation, especially as I could exclude any other possible causes.

Fig. 14.—Minnie L. after operation. Results: pain removed, much of the opacity has been absorbed, and without anything being done to the eye itself, the vision has come up from 3/200 on October 3, 1921, to 20/50 on December 5, 1921.

Fig. 15.—An attempt to study Minnie L.'s sinus through mouth; study of no value.

Fig. 16.—Mr. W. H. M., 30 years old, suffered from recurrent keratitis; picture of left eye as it appeared to the artist.

Fig. 17.—W. H. M. Left keratitis; bone very hard and firm, eroded high up; bone friable, not thick, rough and jammed far back.

Fig. 18.—W. H. M. following operation.

Fig. 19.—Mrs. A. B. W. Interesting case where the vision was not only down on the temporal side, but did not exist on the nasal side; trouble would disappear upon treatment of the nose with iodin; she suffered at intervals with violent headaches. Nasal operation was performed, the vision immediately began to come up; no recurrence of headaches, or restricted field of vision.

Fig. 20.—D. R. This is a case which came to me five years ago, when no x-rays were made, as their value was not recognized at that time. But I realized the trouble was of nasal origin, and after the operation it subsided. He has been seen at intervals since, and there has been no recurrence.

Fig. 21.—Mr. T. Typical nose case. This patient had temporal pain on the left side, the pain area covering a spot about the size of a half dollar. This did not vary, came on at nights, grew increasingly severe, until it was extremely difficult to relieve. I made a study of this x-ray and watched the case in the hospital, coming to the conclusion that the cause of the trouble was closure of the sphenoidal sinus. I operated and he was cured of pain. Each case is a law unto itself as regards location of pain, and the clinical symptoms must be considered with the x-ray picture.

Fig. 22.—Mr. T. The best picture we have, taken through the mouth, shows a distinct shadow of the turbinal pressing against the posterior end of the septum, which a succeeding picture (not now available) does not show.

Fig. 23.—H. L. Typical case of central scotoma; the boy could not go to school, had suffered at intervals all his life. The eye conditions and nasal reflexes combined to bring about unusual vaso-motor disturbances. The x-ray picture of the case follows.

Fig. 24.—The x-ray picture shows very little septal pressure, but a good deal of closure due to deflected septum and enlarged turbinals. An operation correcting this relieved the trouble. (H. L.)

Fig. 25.—Mrs. H. Interesting case of functional glaucoma of right side, occurring in a young woman, and destroying, through tension (she developed a 100 point tension) the sight of the right eye. The left eye became somewhat disturbed functionally, and at intervals developed some tension. Immediately following the operation, without anything being done to the eye, the tension in the right eye dropped from 100 to 50, and in the left from 35 to 24. But due to the destructive pathology, the right eye remained more or less painful, and some weeks later I did a LaGrange operation on that eye to relieve this.

Fig. 26.—Mrs. H. This shows the very long and prominent sphenoidal sinuses which are an interesting feature of such cases.

Fig. 27.—Mrs. H. After the operation.

Fig. 28.—Author's method of getting rid of the blood in nasal mastoid or sinus operations, particularly valuable where general anesthetic is used, as is the routine in these cases.

Fig. 29.—Dr. J. D. Poe's plan to keep the tongue out of the way, and etherizing the patient with a stethoscope kept over throat. The operations are done without any blood getting into lungs.

DISCUSSION

Dr. J. A. Stucky, Lexington, Ky.—Unfortunately, many of the x-rays that we have been having in the last year or two have been misleading. They have not told us exactly what part the nasal septum was playing in many of these cases. There is no part of rhinology in which my views have changed more than in the relation of the middle turbinate to the septum. Formerly, I contended that we had better sacrifice the middle turbinate and save the septum. But in the last few years I have learned that these thickening, slightly deviated, partially bifurcated septa interfere with ventilation and drainage of the nasal attic and produce a negative pressure, retaining the secretions in the ethmoid and sphenoid cells. These retained secretions are apt to become purulent and then we have a positive pressure. I have also learned that a great many of us, in operating upon deviating septa, have been doing harm by using too much force. I have seen operators separate the mucosa, cut out the septum, then go in with a pair of forceps and twist and pull as they would at an impacted tooth. This causes trauma that does a great deal of harm. It is the obstructed attic of the nose that is the cause of a great many of these reflex ocular conditions that we meet with. If this is not relieved the condition becomes purulent and then septic.

These cases mentioned by Dr. Cary were in the hospital during the time they were under treatment. Their method of living was changed for the time they were there. It does not take long to get a remarkable change in these cases. Some of the children in my clinic have changed like magic in three or four days as a result of changing their method of living and feeding.

My attention has been called to the work of Englebach and Selfridge on endocrine disturbances. In two cases similar to those mentioned by Dr. Cary, in which I was getting no results at all, I obtained great improvement by using pluri-glandular treatment. I am more and more calling to my assistance the internist in handling these cases. Undoubtedly the necrosing osteitis is caused by pressure, for we have erosion there which medication alone does not relieve. You might as well try to clean the front porch with a sprinkling can as to clean a nose with an atomizer. It cannot be done.

Dr. Cary (closing).—I am convinced that diet is important in these cases, but while the internist is making up his mind what diet to give the patient, you have cured him. The transformation is almost as rapid as anything can be. You do not have to think about diet. Of course you must see that the individual is properly nourished, but it is not a question of diet. It is a question of correcting the zone of disturbance.

I have myself been unable in many cases to classify with exactness the cause of eye conditions such as have been discussed in my paper; of course, we have classified some of the causes. We know for instance, that the absorption of toxins and septic material influences the resistance of the patient. By some this has been thought to be the whole cause, but I can not agree. I am sure you must consider the individual in the broadest aspect, the zone of irritation, *per se*, other contributing factors of irritation, and the individual's resistance. Whatever will lower his resistance, such as eye-strain from not wearing proper glasses, loss of sleep, a trip in the cold, exposure to weather, absorption from tonsils or from septic material which may be around that region, whatever the contributing factor may be, it must be realized and dealt with. So the determining quality of this particular question has three divisions: the anatomical background, the progressive situation, and the amount of resistance manifested against the incidents which precipitate the trouble.

My x-ray man used to believe that x-ray pictures of the nose were of no value, but having again and again seen the clinical results, he now has a different view, and can see the value of them. In a great many persons who have progressive trouble, an x-ray picture made before they were thirty-five or forty would show very little until an analysis of the clinical symptoms taken in conjunction with the x-ray findings, would demonstrate the possibilities of trouble, which would, in a general way, be precipitated the first time the resistance was not great enough to overcome an untoward influence. These various influences do not become effective in a day or over night, but comprise a progressive situation which is extremely interesting. Realizing this, I study these cases from every angle possible, for several days, before I do anything of an operative nature. Once diagnosis is established, I completely remove the bony areas which bring about pressure. The case may require a submucous resection as the first procedure, then a turbinectomy or at least a separation of the turbinal from the nasal septum which it is pressing against. Then, as a rule, it is necessary to take away the ethmoidal wall, if it seems to be chronicly inflamed with consequent bony proliferation; and due to anatomical relations earlier described, most cases require at least the sphenoidal opening to be re-established.

SOME OBSERVATIONS OF LARYNGEAL TUBERCULOSIS*

By Joseph B. Greene, M.D.,
Asheville, N. C.

The fact that the laryngeal lesion is by far the most important complication of pulmonary tuberculosis is my reason for addressing you today on this subject. It is my intention simply to present to you some results of my experience in the care of this serious and distressing condition. I shall also attempt to reconcile, or rather explain, the very divergent methods of treatment now practiced by others in our

*Read before the North Carolina State Medical Society, Winston-Salem, N. C., April, 1922.

profession. I refer to those who rely upon rest of the voice alone, those who believe in radical surgical measures, and those who occupy a medium ground, so to speak, using local applications, and perhaps the cautery in certain selected cases.

As to the frequency of the occurrence of laryngeal tuberculosis as a complication of the pulmonary condition, Lockard considers fourteen observers, including Lake, Schaeffer and Krieg, and found the percentage to be 34.5. This examination, of course, included the mildest cases where the diagnosis of pulmonary tuberculosis had been made.

As to whether or not tuberculosis of the larynx is ever primary, has long been a mooted question which has never been satisfactorily answered. In my opinion the larynx may be attacked primarily, but so rarely that its occurrence has no practical significance.

Fetterolf examined the larynges of one hundred patients who had died of tuberculosis at the Henry Phipps Institute, in Philadelphia, and found that eigthy-three showed gross tuberculous lesions; thirteen were apparently free from invasion; and four were doubtful. The writer expressed the opinion that others might have shown tubercle formation had sections been made and examined under the microscope.

As the tuberculosis specialist has for years been pleading for an early diagnosis of the pulmonary lesion before the usual symptoms of cough, elevation of temperature, etc., appear, and when the disease is most amenable to treatment, so we, as laryngologists, make a plea for the early diagnosis of the laryngeal complications before the appearance of the usual symptoms, hoarseness and pain. It can hardly be questioned that the most gratifying results in our treatment of laryngeal tuberculosis are obtained in the early stages of the disease.

The success of the plea for an early diagnosis of the pulmonary lesion is evidenced in the frequency of cases now appearing at our health centers for conditions other than those of tuberculosis. In order to make an early diagnosis of laryngeal tuberculosis, it is necessary to make regular, systematic examinations of the larynx. This should be done as a routine, whether there be symptoms referable to the larynx or not. It may be a fairly late lesion when the symptoms of hoarseness and dysphagia appear.

Without entering fully into the question of diagnosis of tuberculosis of the larynx, I may say that the appearance of acute laryngeal symptoms, such as hoarseness, increase of cough and expectoration, with the appearance of redness of the larynx, should make us think of a laryngeal complication, particularly so if the duration is more than a fortnight. The appearance, too, is very suggestive if the redness be localized on one side of the larynx, or the posterior commissure. Swelling of the arytenoids or the epiglottis in the tuberculous is almost a positive diagnostic symptom of a laryngeal complication. It is an accepted fact that the prognosis of laryngeal tuberculosis is greatly dependent upon the pulmonary condition, though this is not always the case, for there are instances where the laryngeal lesion is out of all proportion to the chest findings. It is in the latter type of cases that we are most encouraged in our efforts to improve the local condition in the larynx. Freudenthal says:

> "The curability of tuberculosis of the lungs depends very much upon the cure of the laryngeal condition."

Levy remarks in this connection:

> "While this may be a strong statement, it nevertheless possesses a large element of truth."

In giving a prognosis of laryngeal tuberculosis, there are certain local appearances of the lesion, as well as the general condition of the patient, which influence us in determining what is likely to be the course of the disease. In the first place, the site of the lesion is a very decided factor as to whether or not we may expect an arrest of the local condition.

Intrinsic lesions, that is, those within the larynx proper, as the cords, the ventricular bands or the posterior commissure, are much more likely to run a favorable course than those situated upon the epiglottis, the arytenoids or the aryteno-epiglottic folds. The explanation of the fact that the latter type of cases is prone to run an unfavorable course may be that it is likely to occur late in the

course of the disease, and also the fact that it is the painful areas of the larynx which interfere so much with the nutrition of the patient. However, there are exceptions to this rule, for example, when on the tip of the epiglottis an ulcer appears early which can be surgically removed. Intrinsic lesions of the larynx being rarely painful, though causing hoarseness, we are accustomed to regard in a more favorable light. In giving a prognosis from our laryngeal findings we should also bear in mind whether we are dealing with an infiltration or an ulcerative stage, the latter condition, of course, offering the patient a less favorable outlook. We should determine again whether the case be acute, as evidenced by marked inflammatory reaction, and sometimes edema, or an inactive lesion with a good deal of tendency to fibrosis. The larynx heals, as we know lesions of the lungs do, by resolution and fibrosis.

I would like to emphasize the importance of the laryngeal findings in determining the prognosis; and the treatment likewise depends much upon the type of the disease with which we have to deal. This differentiation of the type and stage of the disease has not, in my opinion, been sufficiently considered, certainly not by myself, which might explain the divergent views held as to the treatment of laryngeal tuberculosis referred to in the early part of the paper. It is obvious that large edematous arytenoids, or acute inflammation of the epiglottis, would require entirely different treatment from that type of disease showing a mild infiltration of the cords or thickening of the posterior commissure.

The first mentioned type has already all the local reaction with which it can contend, and does not require stimulating treatment with such solutions as formalin, lactic acid or nitrate of silver, while the mild, more or less chronic type frequently requires local applications in order to cause a reaction, just as indolent leg ulcers at times require stimulating treatment. If I mistake not, tuberculin is administered in certain types of pulmonary tuberculosis for the purpose of causing a local reaction, bringing fresh blood to the part. We should always bear in mind that whatever local treatment is applied its use has in mind not its disinfecting qualities, but rather the local tissue reaction.

Before proceeding further, I may say that a well-equipped sanatorium, with a treatment room for throat conditions, is almost a requisite for the proper care of laryngeal tuberculosis. The physical condition of the patient is often such that frequent visits to the office for treatment would prove positively harmful. There is no question that rest to the voice, in certain types of the disease, forms a very important element in the treatment of this condition. In fact, it may be the only therapeutic agent required. This would be the case, probably, in early infiltration of the cords and posterior commissure, particularly when there is considerable inflammatory reaction. In the late lesions, with a tendency to fibrosis, and likewise in cases where the epiglottis alone is involved, I am not at all sure that silence has any influence whatsoever on the course of the disease. The comparison often made of the advisability of prescribing rest alone to the larynx, as is done in cases with tuberculosis of the lungs, or a joint tuberculosis, is hardly a fair one, for the reason that neither the alveoli of the lungs, nor the tissues of a joint are accessible for local treatment as is the case with the larynx.

As it is often a difficult problem to decide just when the change from rest to activity should be permitted for the pulmonary patient, so it is with the laryngeal case. It is far safer to return gradually to the use of the voice, watching the effect, if any, produced upon the laryngeal lesion. Care should be taken always to avoid fatigue of the larynx.

As prophylaxis is now so much the order of the day in almost every branch of medicine, so it would seem that we should take every measure which would tend to prevent this distressing laryngeal complication. A patient with pulmonary tuberculosis, especially if he has positive sputum, should not strain his voice by loud talking or singing. Needless coughing should, so far as possible, be controlled. In order to protect the larynx from trauma of inspired air, it is very impor-

tant that nasal respiration be established. The harmful effect upon the larynx of breathing through the mouth cold and dusty air, is so evident as to need no argument from me. If medical treatment of the nasal mucous membrane will not suffice to insure nasal respiration, it may be necessary to resect a deviated nasal septum or remove an obstructing middle turbinal body. Infected nasal sinuses should be treated and, if the patient's condition will permit, diseased tonsils, which are positively harmful, should be removed, under local anesthesia, of course. Infected sinuses and diseased tonsils are harmful on account of the tendency for the spread of their infection downward to the larynx, and in this way producing a simple laryngitis, a place of least resistance for the tubercle bacillus. A simple laryngitis in the tuberculous should receive appropriate treatment, emphasizing the necessity of rest to the larynx.

I have found formalin applications, beginning with 2 per cent solutions, applied on alternate days with an applicator, useful in certain indolent ulcerations and in sub-acute and chronic infiltrations. In advanced lesions of the larynx, with extensive ulcerations, it seems best not to resort to local treatment other than the most soothing sprays to add to the patient's comfort. These patients complain greatly of a dryness of the larynx, which can be helped by a spray of hydrocarbon oil.

In case of ulcer of the epiglottis situated near the tip and which is causing pain, the cartilege should be removed surgically. There are cases, however, particularly those occurring late in the disease, where the benefit derived from the removal does not justify the operation. In fact, we must consider in every case whether we purpose to cause arrest of the disease or whether we simply wish to make the patient more comfortable. Many, unfortunately, fall within the latter class.

For the relief of pain, where the lesion is not entirely confined to the epiglottis, there is no measure to be compared to injection of the internal laryngeal with 75 per cent alcohol. The injection is made just at the point where the nerve pierces the thyro-hyoid membrane. Failure will sometimes result from effort to inject the nerve, due, probably, to the alcohol's not reaching the proper point. However, an occasional failure should not cause one to abandon such a useful procedure.

I have one accident to report, that of paralysis of one side of the tongue, which caused great inconvenience in both talking and eating. This lasted with lessened discomfort for a period of about six months. This mishap was due either to the fact that the landmarks were lost and the injection was made at the wrong place, attacking the lingual nerve, or else the nerve took an anomalous course. The duration of the anesthesia usually lasts for three or four weeks, though I have two patients under my care, one for a year and a half, and the other for nine months, who required only a single injection. It is not likely that the nerve remains anesthetic for this period of time, but rather that healing of the laryngeal lesion takes place during the time when food is comfortably taken, and nutrition is thereby improved.

The technic I shall not go into, as it was fully described by Fetterolf in the *Annals of Otology, Laryngology and Rhinology*, March, 1912.

Solar therapy I have not tried in a sufficient number of cases to be convinced of its therapeutic usefulness.

For the treatment of the larynx in selected cases, the electric cautery is, in my opinion, of the greatest service. It is particularly useful in the sub-acute and chronic cases which need a fresh blood supply brought to the part to produce resolution and fibrosis. Dr. George B. Wood has shown by animal experimentation that the action of the cautery needle extends well beyond the point of the puncture. Microscopic sections of this tissue subsequently made showed the disappearance of the tubercles. Ulcerations, if not too extensive, do well under this form of treatment. Large swollen arytenoids shrink markedly after a few punctures with the electric cautery. By this measure pain is sometimes relieved and laryngeal obstruction requiring tracheotomy may be avoided. In my experience there

has been no tendency to ulceration with secondary infection at the site of the puncture as might be expected. An exudate of fibrin is thrown out, which is protective and a better blood supply is given, serving to prevent tissue necrosis. Finally in a swollen and infiltrated condition of the epiglottis, which is prone to produce great pain on swallowing, and which is seldom relieved by injecting the internal laryngeal nerve, the use of the electric cautery needle is strongly indicated. Strange as it may seem, the pain is greatly lessened or entirely disappears after the cautery needle. When the reaction has subsided, which is usually not marked, the epiglottis is noted to be considerably reduced in size. It is my custom to make about three punctures at each operation and intervals of about two weeks till the infiltration is absorbed with the formation of scar tissue.

CONCLUSIONS

In conclusion, I wish to emphasize the following points:

(1) It is important that regular, systematic examinations of the larynx in every case of pulmonary tuberculosis be made in order that the diagnosis may be made in its incipiency, when it is most amenable to treatment.

(2) Regard with suspicion slight laryngeal symptoms in the tuberculous.

(3) Sanatorium treatment is very desirable for the successful care of the tuberculous throat.

(4) Enjoin rest to the voice in the early stage of laryngeal tuberculosis, and during the active stage of all forms of the disease, except where the epiglottis alone is involved.

(5) In the subacute and chronic forms of the disease, local applications are helpful in arresting the progress of the disease.

(6) For the relief of pain, alcoholic injection of the internal laryngeal nerve should be tried.

(7) In certain selected cases, there is no form of treatment so efficacious as the electro-cautery.

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THE TREATMENT OF GASTRIC AND DUODENAL ULCER

One of the outstanding features of the recent meeting of the American Medical Association in St. Louis was the joint symposium of the Sections on Surgery and Gastro-Enterology on "The Treatment of Gastric and Duodenal Ulcer."* The subject was introduced by Dr. Arthur Dean Bevan, of Chicago, with a paper entitled the "Relative Value of Surgical and Medical Treatment of Gastric and Duodenal Ulcer." He made a comparison of gastric and duodenal ulcer with varicose ulcers, stating that if both were given rest, in uncomplicated cases, the majority would heal without operation, but that those with complications would require surgical treatment. In his summary Dr. Bevan said:

"To visualize this a little more clearly, let us take 100 cases of peptic ulcer. Practically all of these should be given at first the benefit of sound medical management. Possibly ninety of these patients may be cured and kept well by medical management. Probably 10 per cent of these cases, after repeated trials of medical management, will prove refractory and should then be given the benefit of exploratory operation and surgical therapy."

Dr. Bertram W. Sippy, of Chicago, followed with a paper on "Relative Value of Medical and Surgical Treatment of Gastric and Duodenal Ulcer." Dr. Sippy discussed the question from the medical viewpoint. In part he said:

"The relative value of medical and surgical treatment of peptic ulcer and the indications for each are dependent upon a number of factors. Among these, three stand foremost. The first factor has to do with the conditions and complications that attend the ulcer. The second involves a careful consideration of the character of the surgical treatment to which the patient is to be subjected. Herein the skill of the surgeon who is to perform the operation is of the utmost importance, since it influences enormously the immediate mortality and, to a lesser degree, the late bad effects of the operative treatment of the disease. The third pertains to the straightforwardness with which the type of medical treatment employed combats or removes the conditions that retard or prevent healing and thus contributes to the eradication of the ulcer and its complications."

Dr. Sippy's conclusions were that medical treatment will cure the great majority of cases of ulcer and that surgery should not be resorted to until a thorough effort at medical treatment has been made.

Dr. W. J. Mayo's paper, entitled "Progress in the Handling of Chronic Peptic Ulcer," was read by Dr. Charles Mayo, who among other things said:

"Each case must be considered individually, and when it is reasonably possible, careful medical management of the ulcer should be given a thorough trial before operation is recommended. Following operation, the after-care of the patient should be conducted by the internist. Possibly educational propaganda may be instituted for the benefit of the patient with peptic ulcer, as has been done for the patient with diabetes."

In speaking of failure to cure in operations for ulcer, Dr. Mayo said:

"To express it in the form of an Hibernicism, the most frequent cause of surgical failure in such cases is to operate for peptic ulcer when there is no ulcer. At the Mayo Clinic we have removed several hundred unnecessary gastroenterostomies that had been made in good faith and bad judgment; fourteen of them were our own early cases."

Mayo's conclusions were as follows:

(1) Duodenal ulcer is treated satisfactorily by surgery in approximately 95 per cent of cases,

*Bevan, Arthur D.: Relative Value of Surgical and Medical Treatment of Gastric and Duodenal Ulcer. J. A. M. A., Vol. 79, No. 1, July 1, 1922.
Sippy, Bertram W.: Ibid.
Brown, Thomas R.: Ibid. Discussion by Drs. Finney, White, Alvarez, Ochsner, Smithies, Coffey, Harris, Horsley, Bevan, Mayo, Sippy and Brown.—Ibid.

although in 1 or 2 per cent of these a second operation may be required. The ulcer is not associated with cancer liability.

(2) The average operative mortality in cases of duodenal ulcer, including the acute and chronic cases, is under 2 per cent from all causes; and, as the part of the duodenum usually involved is merely the vestibule of the small intestine, permanent interference with function is slight.

(3) In cases of gastric ulcer, satisfactory results are obtained by one operation in more than 85 per cent. In the remaining cases, a secondary operation, preferably resection which eliminates to a great extent future ulcer possibilities, brings the surgically satisfactory group of gastric ulcers well above 90 per cent; but there is a definite cancer liability in the years to follow.

(4) The average mortality in the operative treatment of cases of gastric ulcer, including the acute and chronic cases, is about 3.5 per cent. The stomach has important functions to perform and a certain amount of permanent crippling may result.

(5) In about 50 per cent of the patients who fail to obtain satisfactory relief, the difficulty is functional and can be relieved by medical management. The other 50 per cent must be classified as surgical failures due to faulty mechanics and will require secondary corrective surgical procedures for relief.

(6) The patient's general condition must be considered and rational habits of living established. The elimination of all sources of focal infection is also an essential measure.

Dr. Thomas R. Brown, of Baltimore, in a paper entitled "The Relative Roles of Medical and Surgical Treatment in Gastric and Duodenal Ulcer," urged that there is no one method of treatment in gastric and duodenal ulcer, that each case must be treated upon its merits. Some require surgery and others may be cured medically. He says:

"In a disease of such varied etiology there must be a varied therapy, and the proper utilization of that therapy must be fitted to the case under study, be it regulation of life, dietetic suggestions, the use of drugs, the application of various forms of physical therapy or the utilization of one of the various surgical procedures and must of necessity be determined in each case individually. To hold a brief for any special therapeutic procedure, be it the employment of a rigorous scheme of diet, or a certain drug, or a small bucket on the end of a rubber tube, or a special operative method, is unscientific and unsound and unsafe. Each case must be regarded individually; each case has its special features in etiology and symptomatology, and in each case these must be carefully considered in planning the appropriate treatment."

In the discussion that followed Dr. Jno. M. T. Finney, of Baltimore, spoke of the difficulties of diagnosis of ulcer even with operation and gave as his opinion that the best method, where surgery is required, is to extirpate the ulcer whenever it is feasible. He preferred to do this through a pyloroplasty incision if possible.

Dr. Franklin White, of Boston, said:

"The treatment of ulcer is not medical or surgical, but a combined treatment, one method being employed as far as available followed by the other method. We get good, permanent results with medical treatment in a large percentage of cases."

Dr. Seale Harris, of Birmingham, discussed the difficulty and importance of the early diagnosis of ulcer. He said in part:

"One diagnostic point I should like to bring out is the syndrome of the so-called chronic appendix. About 50 per cent of patients with ulcer who come to me have first had an appendectomy with a small incision in the right lower quadrant of the abdomen. The surgeon who operates in a case of chronic appendicitis, so-called, with a small McBurney incision, in an operation of election, not an acute case, and does not extend that incision up to explore the duodenum, the stomach and the gall bladder, is very remiss in his duty to his patient. We shall come nearer approaching the 100 per cent cures when we make the diagnosis early. Ulcer is first a medical case, and the number of cures depends to a considerable extent on the technic of the physician."

Others voiced the general opinion that in the treatment of ulcer the physician and surgeon should work together. It was stressed by a number of speakers that the patient should go on a prolonged diet after operation as well as after medical treatment. While there were a few notes of pessimism in the discussion, most of the speakers were optimistic as to results of treatment. Practically all agreed that the patient should be given an opportunity for a cure by medical treatment before surgery is attempted.

The papers and discussions in this important symposium form a valuable contribution to the literature of gastric and duodenal ulcer.

TUBERCULOUS LARYNGITIS

It is very gratifying to make a survey of diseases which within comparatively recent years were regarded as incurable, and to note that many of them, thanks to a better understanding of their underlying processes, are now amenable to treatment and often susceptible of arrest. Many can recall the time when the diagnosis of pulmonary tuberculosis was fraught with a most unfavorable prognosis, while with the presence of a laryngeal complication the case was regarded as well-nigh hopeless. We now know that many cases of tuberculosis of the lungs are capable of being arrested, if they are diagnosed sufficiently early and receive suitable treatment.

It is little appreciated by the profession as a whole that a diagnosis of laryngeal tuberculosis does not necessarily carry with it the dire prognosis that was formerly attached to it. While this complication must always remain one of serious import, it is realized that it, too, is in many instances quite responsive to treatment, and is frequently susceptible of arrest and cure.

In view of the frequency of laryngeal tuberculosis, and of the fact that this complication may be present with little or no subjective symptoms, the importance of a routine examination of the larynx in all suspected pulmonary or laryngeal tuberculosis cannot be too greatly stressed; for while these symptoms may not be manifest until the process is fairly well advanced, hoarseness and pain may arouse our suspicion, and much more reliance should be placed upon the appearance of the throat. Especial diagnostic importance attaches to a localized redness on one side of the larynx, or to redness and swelling of the posterior commissure. Examination of the throat is essential in order that proper therapeutic measures may be instituted without delay, for not only are the early stages of laryngeal tuberculosis most responsive to treatment, but the measures to be employed will be dependent to a large extent upon the location and character of the laryngeal lesion.

Rest of the larynx is the most important therapeutic measure and one which if followed to the letter will result in the healing of the laryngeal lesion in many cases. Thus simple infiltration of the cord or posterior commissure may demand no other treatment than the institution of silence for a period of several months. However, rest alone will not always cure and we must have recourse to other therapeutic measures which have recently become available.

On another page of this issue Dr. J. B. Greene,* of Asheville, describes the various types of tuberculous inflammation of the larynx and outlines the treatment which may prove helpful. In subacute or chronic infiltrations, and in indolent ulcerations, the use of stimulating solutions such as formalin, lactic acid and nitrate of silver applied locally, may be very beneficial; while in more advanced lesions with extensive ulcerations, it may be that all that should be attempted is to minister to the patient's comfort by the use of soothing sprays. Much can be done in what were heretofore considered hopeless cases.

In the case of a tuberculous larynx, not infrequently it is possible to relieve suffering and to effect a cure by operative measures: thus an ulcer located near the tip of the epiglottis may be removed surgically. In a certain number of cases where pain originates from

*Greene, Jos. B., "Some Observations of Laryngeal Tuberculosis," p. 664.

other regions of the larynx, there is no method comparable with that of injecting the internal laryngeal nerve with alcohol.

Dr. Greene speaks favorably of the use of the electric cautery which in selected cases is productive of striking results. With its employment swollen arytenoids become shrunken; pain is lessened, and the operation of tracheotomy to relieve obstruction is sometimes avoided. An infiltrated epiglottis which causes severe pain on swallowing, interfering with the proper nourishment of the patient, and which is not relieved by injection of the internal laryngeal nerve, may respond to puncture with the cautery needle with a lessening of pain and a reduction of the size of the epiglottis.

It is to be regretted that as yet there are no means of dealing with tuberculous foci in the lungs comparable with the direct attack possible upon the involved tissue of the larynx.

DEEP X-RAY THERAPY

The many papers appearing in current medical literature and the various abstracts from foreign journals convey messages of progress with encouragement for those suffering with malignancy. This is engendered by the development of x-rays which have a greater penetration than has been possible to procure in the past, through the development of higher voltage and enlarged tubes. This ideal has been sought for years. It is stated that before long we shall have a still greater penetration by increased voltage.

Dr. R. H. Millwee, describing methods of x-ray treatment in European clinics,[1] notes that the general technic varies little in most of these. He visited Opitz and Friedrich's Clinic, in Freiburg, Baum's and other gynecological clinics, of Berlin, and Sitz and Witz, of Erlangen. He says:

> "With the various workers there seemed to be little difference of opinion as regards general principles of the application of roentgen and radium ray to the treatment of deep seated malignancy. Voltage of 220,000 peak volts was used. Radium was usually used in connection with x-rays. All believed . . . that the advantage gained by the employment of x-rays of high voltage (220,000) is that of better dosage to deep seated lesions without permanent damage to essential normal structures. They were unanimous in their approval of the accurate measurement of dosage by the ionization process. . . ."

Dr. E. C. Ernst, in the same issue of the Journal[2] states that the immediate practical clinical results of the present more intensive x-ray therapy are that it has "more effectively influenced malignant tumor pathology than any other less intensive radiations employed in the past."

Dr. Louis Frank,[3] in an article entitled the "Treatment of Cancer of the Uterus with Radium," concludes that

> "If the five-year period of curability is to be accepted as indicating a cure, then the results of radium treatment surpass by far those obtained by the profession at large in the treatment of cancer of the cervix by surgical means."

In certain continental clinics surgery has been put aside for deep x-ray therapy.

We are good wishers for any true progress, and we hope that this is a true progress, yet we raise our voice in caution not to be too rapid but to mark time. Results obtained are to be carefully compiled and a period of trial is necessary before accepting anything new in treatment to the exclusion of the old.

Deep therapy is a distinct step forward and undoubtedly possesses merit, but not such as to warrant discontinuance of our many past procedures. If surgery is to be discarded in its favor then we should first gather more information and make

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1. Millwee, R. H.: European Impressions and Personal Experience in the Use of High Voltage X-Rays in Deep-Seated Malignancy. Southern Med. J., Vol. XV, 6, 444.

2. Ernst, E. C.: The Practical Status of Deep Therapy with the Advent of Higher X-Ray Intensities.—Ibid.

3. Frank, Louis: Treatment of Cancer of the Uterus with Radium.—Ibid.

certain of our progress. It will be recalled that the discovery of radium by Madame Curie was heralded throughout the world as the great cure for malignancy. Consequently in the reaction from such over-enthusiasm its real worth was discredited by many. Now radium has been demonstrated without a doubt to possess great usefulness in certain types and stages of malignancy as well as in many benignancies.

Dr. Coolidge is working upon a tube which will carry even greater voltage, and coils are being made to provide this increased voltage. Let us hope that he will be highly successful in his efforts; but until time and clinical data prove such a success, let us hold to the tried methods. And let us remember that education of the public and early diagnosis are the best weapons yet found against malignancy.

Book Reviews

Anxiety Hysteria. Modern Views on Some Neuroses. By C. H. L. Rixon, M.D., M.R.C.S., Senior Neurologist, Ministry of Pensions' Neurological Hospital, Exeter; Late House Physician, Casualty Officer, and Resident Anesthetist, St. Thomas' Hospital; Captain, R.A.M.C.; Officer-in-Charge Neurological Section, Reading War Hospital And D. Matthew, M.C., M.B., Ch.B., Neurologist, Ministry of Pensions' Neurological Hospital, Exeter; Late House Physician and House Surgeon, Dundee Royal Infirmary; Captain, R.A.M.C.; Neurologist, Craiglockhart War Hospital for Officers, Edinburgh. With a Foreword by Col. Sir A. Lisle Webb, K.B.E., C.B., C.M.G., etc., Director General of Medical Services, Ministry of Pensions. 123 pages. New York: Paul B. Hoeber, 1921. Cloth, $1.50.

Many men whose mental control was shaken by the experiences of the recent War, must receive medical attention from physicians or specialists in mental diseases. For the benefit of these this brief book describes the pathology, symptomatology, and treatment of anxiety hysteria, including conversion hysteria. The description of treatments and the case reports are practical and well selected.

Health Service in Industry. By W. Irving Clark, Jr., M.D., F.A.C.S., Service Director, Norton Co., Worcester, Mass. Lecturer on Health Administration in Industry, Harvard Medical School; Assistant Surgeon, Memorial Hospital, Worcester, Mass. 168 pages. New York: The Macmillan Co., 1922. Cloth, $3.00.

To the physician interested in public health work as conducted by large industrial concerns or to the superintendent of a factory, this book contains many helpful suggestions. It is as brief and simple as possible and describes good workable methods. Many books have been written upon public health and public health nursing, but few upon this particular phase of it.

The Defective, Delinquent and Insane. The Relation of Focal Infections to Their Causation, Treatment and Prevention. By Henry A. Cotton, M.D., Medical Director, New Jersey State Hospital at Trenton; Lecturer in Psycho-Pathology, Princeton University; Director, Psychiatric Clinic for Correctional Institutions of New Jersey. With a Foreword by Adolf Meyer, M.D., Director of the Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, and Professor of Psychiatry, Johns Hopkins University. With 196 pages. Lectures Delivered at Princeton University, January 11, 13, 14, 15, 1921. Princeton: Princeton University Press, and London: Oxford University Press, 1921.

Many statements are made in this work which are well recognized, others which are not conceded by the public. It is stressed that insanity is not hereditary more than tuberculosis, but that certain constitutional weaknesses which lower the resistance to either disease may be inherited. The language is direct and may be readily comprehended by the laity. The case reports lose some of their interest by the fact that they all have the same moral: that is, each is a case of mental derangement produced by a focal infection and usually cured by the removal of the focus. Of course, the menace of focal infections within the body can not be too highly stressed.

The closing chapter describes the organization of a psychopathic hospital.

The Venereal Clinic. The Diagnosis, Treatment and Prevention of Syphilis and Gonorrhea. A Handbook of Venereal Disease in Relation to the Individual and the Community. By Several Writers. Edited by Ernest R. T. Clarkson, M.A. Contab., M.R.C.S., L.R.C.P., Chief Clinical Assistant, Urogenital Department (Males), London Hospital; Late Demonstrator in Human Anatomy, University of Cambridge. With an introduction by Sir Squire Sprigge, M.D. 477 pages. Illustrated. New York: Wm. Wood & Co., 1922. Cloth, $6.50.

Since the World War the importance of venereal diseases has been stressed to such an extent that the best talent has been engaged in work along this line.

The "Venereal Clinic," an English work of a few hundred pages, treats the subject fully, and especially is this true of gonorrhea. The chapter on the use of the urethroscope, which is profusely illustrated, is especially good.

Part II, entitled "Sociological and Administrative," is valuable to the physician regardless of whether or not he treats venereal diseases.

The Law of Vital Transfusion and the Phenomenon of Consciousness. An Account of the Necessity for and Probable Origin of the Conscious State in the Evolution of the Organic World, with a Preliminary Statement of Fundamental Cosmical Principles. By Charles J. Reed. 74 pages. San Francisco: Occidental Publishing Co., 1921. Cloth, $1.50.

Briefly, this is an explanation of the origin and cessation of consciousness. Life is defined as "the period of activity of the involuntary vital function." The law of vital transfusion, deals with the law of parasitic, that is mammalian, reproduction, which explains the evolution of the organic world. From the law of vital transfusion comes the evolution of sex, of more complex organisms, and the power of cognition.

The exodus of the conscious state is finally explained. Its dependence upon the operation of the involuntary vital function is established. Therefore, when this ceases to operate, consciousness, which is not a thing but a process of change, ceases to exist.

The sequence of ideas is logical and scientific.

Reports of the St. Andrews Institute for Clinical Research. St. Andrews, Fife (England). Vol. 1. New York and London: The Oxford Press, 1922. 208 pages. Cloth, $3.00.

The object of the St. Andrews Institute was originally "the prevention of those diseases that are common among the people of this country" and to that end a study is made of the life history of these diseases. By this they were led into a statistical study to find which diseases were most common, and the methods of diagnosing them.

The book contains three chapters by Sir James Mackenzie, the most interesting of which is the "Theory of Disturbed Reflexes in the Production of Symptoms of Disease." Other contributors are Drs. Andrew Rowland, P. T. Herring, A. Marland Ramsay and David Waterston; and J. H. P. Patton and James Orr, M. B.'s. It is important for its information and its point of view.

The Major Symptoms of Hysteria. Fifteen Lectures Given in the Medical School of Harvard University. By Pierre Janet, Ph.D., M.D., Member of the Institute of France, Professor of Psychology in the College de France. Second Edition, with New Matter. New York: The Macmillan Co.

The words of a great alienist are quoted who said that all the great things accomplished in the world had been accomplished by mad people. To be great is to be abnormal, not like the average, and to be insane is to see things not like the average. Janet says that most great creeds have been spread by the emotions of hysterical people.

He divides the study of hysteria into three periods:

(1) The anecdotal and descriptive period, of sibyls, witches, convulsionists and resurrections, somnambulisms.

(2) The clinical period which began in the Nineteenth Century.

(3) Psychological period. Interpretations of things due to mental phenomena.

Later, perhaps, he thinks, the anatomical and physiological period may come.

He deals chiefly with cases of dual personality, somnambulisms, classified in different ways.

A Text Book of Clinical Periodontia. A Study of the Causes and Pathology of Periodontal Disease and a Consideration of Its Treatment. By Paul R. Stillman, D.D.S., Instructor in Periodontia, Columbia University, New York; Past President of the American Academy of Periodontology; and John Oppie McCall, A.B., D.D.S., Instructor in Periodontia, Columbia University, New York; Formerly Professor of Oral Hygiene and Periodontia, Dental Department, University of Buffalo, N. Y.; Past President, American Academy of Periodontology. Profusely illustrated. 240 pages. New York: The Macmillan Company, 1922.

This work is not intended primarily for physicians but for dentists. However, considering the stella role played by periodontaclasia (pyorrhea) in medicine today, a review of this work is in order.

Appealing strongly to medical men is the classification of the indications for dental extractions. Coming from New York dentists it appears radical, but to a Westerner it might seem conservative enough.

Commendable also is the deserved emphasis placed upon the etiological factor of traumatic occlusion.

If we could offer a word of criticism it would be that the existence of pyorrhea as purely secondary to some primary focus, as for example chronically infected tonsils, is not stressed strongly enough.

The book is without doubt the most scientific and best treatise on the subject that has appeared. The authors have taken a much muddled subject and greatly clarified it by adopting a logical nomenclature.

They are taking a bold stand for the conservative East and are doing really great "missionary work" in recommending the removal of all dead teeth (see pages 131-132) for patients whose physical condition, age and obstacles interfering with ideal root canal technics make it unsafe for them to be retained as a part of the human mechanism.

Obstetrical Nursing: A Text Book on the Nursing Care of the Expectant Mother, the Woman in Labor, the Young Mother and Her Baby. By Carolyn Conant Van Blarcom, R.N. 200 illustrations and 8 charts. New York: The Macmillan Co., 1922.

The author has presented the subject matter from the human and constructive viewpoint, emphasizing throughout the necessity of careful attention in every stage of pregnancy, labor and the puerperium.

She advances the very wholesome idea that the future health of the mother should receive close study and as a result a corresponding development in the child would be secured.

The text may be somewhat amplified but the simple diction, the logical analysis of the various subjects considered and the exhaustive presentation of the entire scheme of motherhood renders the book a valuable adjunct to the nursing profession and commends it to the student who desires a liberal and varied knowledge of obstetrical nursing technic.

Especially interesting and instructive is the chapter on the mental hygiene of the expectant mother, a feature of maternity work so little understood by the average nurse.

The chapter on organized prenatal work—public health nursing—presents a timely and important phase of modern obstetrics and very ably outlines the significance and need of such a program.

As a whole, the book is a splendid review of obstetrical nursing and the care of the new-born and of the child in early infancy.

Southern Medical News

SOUTHERN ASSOCIATION OF ANESTHETISTS

A Southern Association of Anesthetists is being organized and will hold its first meeting in conjunction with the Southern Medical Association at Chattanooga in November.

It is the idea of those interested in the organization that the South will welcome and support a society devoted to the science and art of anesthesia and analgesia, as other sections of the country have had for several years—live, growing societies devoted to the growth and advance of this specialty and to the elevation of this vital phase of medicine to its proper status as a full-fledged specialty.

Those interested are requested to communicate with Dr. W. Hamilton Long, 1911 Duker Avenue, Louisville, Ky., Organization Secretary.

ALABAMA

The State Board of Health has made a statement that there has been a great reduction in the number of deaths from typhoid fever during the five years ending September 30, 1921.

Deaths

Dr. William Richard Jackson, Mobile, aged 58, died suddenly early in July from heart disease.

Dr. Andrew Jackson L. Dennis, Montgomery, aged 66, died April 12.

Dr. Richard Proctor Huger, Anniston, aged 72, died June 3 from heart disease.

ARKANSAS

Dr. Morgan Smith, Dean of the University of Arkansas Medical Department, Little Rock, announced that with the resumption of the junior and senior years, the opening of the University will be augmented with an additional staff of instructors and full clinical facilities. The following have officially become affiliated with the School of Medicine: City Hospital, St. Vincent's Infirmary, St. Luke's Hospital and the Baptist State Hospital. The new curriculum will include a department of hygiene and public health, with Dr. C. W. Garrison as Professor, to serve during his term as State Health Officer.

At a recent meeting of the executive committee of territorial and state health officers, in Washington, D. C., Dr C. W. Garrison, Little Rock, was chosen a member.

Dr. Frances Sage Bradley, formerly of Georgia, has been appointed Director for Arkansas of Infant Hygiene under the Sheppard-Towner Maternity Act. Dr. Bradley's offices will be in Little Rock.

Deaths

Dr. Ewell Pollett, Jonesboro, aged 33, was instantly killed June 16 when the automobile in which he was riding overturned.

Dr. Joseph C. Cleveland, Bald Knob, aged 69, died June 4.

Dr. Moses Cline Hughey, Marianna, aged 44, died May 28 at Hot Springs from uremia.

DISTRICT OF COLUMBIA

The Ball bill, designed in the interest of public health, comfort and morals, to discontinue the use of dwellings or buildings situated in alleys in the District of Columbia, has passed the Senate.

The National Tuberculosis Association has elected Dr. George M. Kober, Washington, Secretary.

The American Society of Tropical Medicine has elected Dr. Brayton H. Ransom, Washington, Secretary-Treasurer.

The American Ophthalmological Society has elected Dr. William H. Wilmer, Washington, President.

The United States Veterans' Bureau in Washington has appointed Dr. L. B. Rogers, formerly Manager of District No. 3, comprising Pennsylvania and Delaware, executive officer.

The Commonwealth Fund will finance a child health program in three typical cities for a period of five years. The Executive Secretary of the Child Health Committee for the Supervision of Three Child Health Demonstrations, Washington, has announced that the general qualifications of the first city to be selected are that it shall be from 15,000 to

25,000 in population, with an infant mortality of approximately 100 per thousand live births, or greater. It is understood that the first city to be assisted will be selected from the upper half of the Mississippi Valley region.

Dr. John A. Foote, Washington, has been elected President of the Society of American Teachers of Diseases of Children.

Representative Sproul has introduced into the lower house of Congress a bill which provides for the erection of a hospital for the care of tuberculous pupils of the District of Columbia. The sum of $150,000 has been appropriated to carry out the proposed construction.

Dr. John Minor, Washington, and Miss Mildred Angevine Truslow, Summit, N. J., were married April 22.

Deaths

Dr. John Cropper Wise, Washington, aged 73, died June 13.

Dr. William V. Marmion, Washington, aged 82, died May 24 following a long illness.

FLORIDA

The Florida State Medical Association has elected the following officers: Dr. L. M. Anderson, Lake City, President; Dr. Deland Carlton, Tampa, Vice-President; Dr. Graham E. Henson, Jacksonville, Secretary-Treasurer. The next meeting will be held in Jacksonville.

The Florida Railway Surgeons' Association has elected the following officers: Dr. L. S. Oppenheimer, Tampa, President; Dr. E. W. Warren, Palatka, Secretary.

The State Medical Clinic, under the direction of the Florida Division for the U. S. Veterans' Bureau, Jacksonville, has moved its quarters to the St. James Building.

Deaths

Dr. Edward F. Bruce, Pensacola, aged 45, was found dead in his office June 19.

Dr. Joseph Albert Hague, Alton, aged 38, died June 12.

GEORGIA

The first of several tonsil and adenoid clinics was recently held in Wilkes County, under the auspices of the Department of Child Hygiene, the State Board of Health and the Parent-Teachers' Association.

Chattooga County Medical Society has elected the following officers: Dr. M. N. Wood, Menlo, President; Dr. F. W. Hall, Summerville, Vice-President; Dr. J. P. Webb, Secretary-Treasurer.

Heard County Medical Society has elected the following officers: Dr. J. W. Daniel, Franklin, President; Dr. A. G. Wortham, Franklin, Vice-President; Dr. Frank J. Amis, Jr., Franklin, Secretary-Treasurer.

Jackson County Medical Society has elected the following officers: Dr. J. B. Pendergrass, Jefferson, President; Dr. F. M. Hubbard, Commerce, Vice-President; Dr. J. C. Bennett, Secretary-Treasurer.

Lamar County Medical Society has elected the following officers: Dr. J. A. Corry, Barnesville, President; Dr. D. W. Pritchett, Barnesville, Vice-President; Dr. J. M. Anderson, Barnesville, Secretary-Treasurer.

Stephens County Medical Society has elected the following officers: Dr. E. F. Chaffin, Martin, President; Dr. J. H. Verner, Jr., Toccoa, Vice-President; Dr. C. L. Ayers, Toccoa, Secretary-Treasurer.

Sumter County Medical Society has elected the following officers: Dr. B. T. Wise, Plains, President; Dr. F. L. Cato, Plains, Vice-President; Dr. J. C. Logan, Plains, Secretary-Treasurer.

Twiggs County Medical Society has elected the following officers: Dr. A. J. Wood, Fitzpatrick, President; Dr. H. A. Rogers, Jeffersonville, Vice-President; Dr. S. W. Ray, Jeffersonville, Secretary-Treasurer.

Dr. W. W. Young, Secretary of the Atlanta Neurological Society, has resigned and accepted the position as Assistant Physician of Massillon State Hospital, Massillon, Ohio. Dr. C. E. Dowman was elected Secretary to fill the unexpired term.

Dr. Dunbar Roy, Atlanta, has been elected President of the American Laryngological, Rhinological and Otological Society.

The offices of the Medical Association of Georgia and of the Journal have removed from 820 Healey Building to Professional Building, 65 Forrest Avenue, Atlanta.

Contracts have been let for seven government hospital buildings at Augusta, to cost $283,000.

The formal opening of the Atlanta Graduate School of Physicians and Surgeons will take place in the fall. The general offices are located in Grady Hospital. The City Hospital and practically every private sanatorium in Atlanta will be affiliated with the graduate school. The following are officers: Dr. William Perrin Nicholson, Dean; Dr. Michael Hoke, President of the Faculty; Dr. Garnett W. Quillian, Vice-Dean; Dr. Frank L. Eskridge, Proctor for the Faculty. The first course offered at the graduate school will be in orthopedic surgery, after which will be courses in general and abdominal surgery, gynecology and obstetrics, internal medicine, eye, ear, nose and throat, pediatrics, dermatology, neurology, urology and oral surgery.

It has been announced that the Medical Department of the University has been given $40,000 a year by the Rockefeller Foundation, the Carnegie Foundation and the City of Augusta, through popular subscription, for placing the departments of medicine and surgery on a paying basis, and for general expenditures.

Drs. Bunce and Landham, Atlanta, announce the removal of their laboratories and offices to Professional Building, 65 Forrest Avenue, Atlanta.

The Chattahoochee Valley Medical Society held its annual meeting in Warm Springs July 11-12.

The following five additional professors for the Medical Department of the University, Augusta, have been announced: Dr. Eliot R. Clark, from University of Missouri, Professor of Anatomy; Dr. Richard V. Lamar, Professor of Pathology; Dr. Virgil P. Sydenstricker, Augusta, Professor of Medicine; Dr. Ralph H. Chaney, Rochester, Minn., Professor of Surgery; Dr. Harry B. Neable, Adrian, Mich., Professor of Preventive Medicine and Hygiene.

Dr. Jesse Littleton Meeks and Miss Ione Tumlin, both of Gainesville, were married June 1.

Dr. Paul Pleasant Cooper, Zirkle, and Miss Sallie Williams, Patterson, were married June 3.

Deaths

Dr. Edmund Franklin Saxon, Winder, aged 44, died May 1 from cerebral hemorrhage.

Dr. Benjamin S. Burton, Valdosta, aged 55, died May 7.

Dr. Henry F. Scott, Atlanta, aged 69, died May 17 from heart disease.

Dr. James W. Mills, Atlanta, aged 89, died June 2.

Dr. L. S. Young, Moreland, aged 83, died June 9 from senility.

KENTUCKY

Caldwell County Medical Society has elected the following officers: Dr. L. O. Young, Cobb, President; Dr. W. P. Morse, Princeton, Vice-President; Dr. R. W. Ogilvie, Princeton, Secretary-Treasurer.

Carter County Medical Society has elected Dr. L. G. Nickell, Grayson, Secretary-Treasurer.

Clark County Medical Society has elected the following officers: Dr. B. F. Johnson, President; Dr. E. P. Guerrant, Vice-President; Dr. Geo. F. Doyle, Secretary-Treasurer.

Clay County Medical Society has elected the following officers: Dr. C. T. Ricketts, President; Dr. G. P. Webb, Vice-President; Dr. J. L. Anderson, Secretary-Treasurer.

Clinton County Medical Society has elected the following officers: Dr. W. A. Grogge, President; Dr. J. A. Sloan, Vice-President; Dr. S. F. Stephenson, Secretary-Treasurer.

Fayette County Medical Society has elected the following officers: Dr. J. P. Warren, Lexington, President; Dr. W. D. Reddish, Lexington, Vice-President; Dr. S. B. Marks, Lexington, Secretary-Treasurer.

Fulton County Medical Society has elected the following officers: Dr. R. N. Whitehead, Fulton, President; Dr. Geo. A. Crafton, Fulton, Vice-President; Dr. H. T. Alexander, Fulton, Secretary-Treasurer.

Green County Medical Society has elected the following officers: Dr. J. C. Graham, President; Dr. J. J. Booker, Vice-President; Dr. S. J. Simmons, Secretary-Treasurer.

Henry County Medical Society has elected the following officers: Dr. W. F. Asbury, President; Dr. R. C. Newkirk, Vice-President; Dr. Owen Carroll, Secretary-Treasurer.

Hickman County Medical Society has elected the following officers: Dr. J. B. Mahan, Clinton, President; Dr. T. L. Lamkin, Clinton, Vice-President; Dr. E. W. Howell, Oakton, Secretary-Treasurer.

Jessamine County Medical Society has elected the following officers: Dr. T. R. Welch, Nicholasville, President; Dr. W. H. Mathews, Nicholasville, Vice-President; Dr. J. A. Van Arsdall, Nicholasville, Secretary-Treasurer.

Letcher County Medical Society has elected the following officers: Dr. T. D. Fitzpatrick, President; Dr. Owen Pigman, Vice-President; Dr. Bert C. Bach, Secretary-Treasurer.

Lewis County Medical Society has elected the following officers: Dr. T. B. Ginn, President; Dr. C. E. Stout, Vice-President; Dr. J. D. Liles, Secretary.

Lincoln County Medical Society has elected the following officers: Dr. T. A. Harmon, President; Dr. T. F. Peyton, Vice-President; Dr. Lewis J. Jones, Secretary-Treasurer.

Livingston County Medical Society has elected the following officers: Dr. J. L. Hayden, Salem, President; Dr. J. E. Fox, Smithland, Vice-President; Dr. E. Davenport, Hampton, Secretary-Treasurer.

Logan County Medical Society has elected the following officers: Dr. L. H. Turner, President; Dr. S. S. McReynolds, Vice-President; Dr. Walter Byrne, Secretary-Treasurer.

Madison County Medical Society has elected the following officers: Dr. W. K. Price, President; Dr. T. H. Rutledge, Vice-President; Dr. T. A. Mahaffey, Secretary-Treasurer.

Mercer County Medical Society has elected the following officers: Dr. H. M. Baxter, Bohon, President; Dr. D. H. Coleman, Harrodsburg, Vice-President; Dr. J. Tom Price, Harrodsburg, Secretary-Treasurer.

Metcalfe County Medical Society has elected the following officers: Dr. P. W. Bushong, President; Dr. W. G. Depp, Vice-President; Dr. H. R. Vanzant, Secretary-Treasurer.

Montgomery County Medical Society has elected the following officers: Dr. R. E. May, President; Dr. C. B. Duerson, Vice-President; Dr. S. E. Spratt, Secretary-Treasurer.

McCracken County Medical Society has elected the following officers: Dr. O. R. Kidd, Paducah, President; Dr. C. E. Purcell, Paducah, Vice-President; Dr. E. R. Goodloe, Paducah, Secretary; Dr. P. H. Stewart, Paducah, Treasurer.

Ohio County Medical Society has elected the following officers: Dr. Willard Lake, McHenry, President; Dr. S. W. Crowe, Centertown, Vice-President; Dr. Oscar Allen, Cromwell, Secretary-Treasurer.

Oldham County Medical Society has elected the following officers: Dr. H. B. Blades, President; Dr. R. B. Cassady, Vice-President; Dr. S. J. Smock, Secretary-Treasurer.

Owen County Medical Society has elected the following officers: Dr. J. H. Christman, Owenton, President; Dr. J. W. Botts, Owenton, Vice-President; Dr. K. S. McBee, Owenton, Secretary-Treasurer.

Owsley County Medical Society has elected the following officers: Dr. B. F. Tye, President; Dr. C. M. Anderson, Secretary-Treasurer.

Perry County Medical Society has elected the following officers: Dr. J. D. Grant, Hazard, President; Dr. M. E. Threlkeld, Hazard, Secretary.

Pulaski County Medical Society has elected Dr. Carl Norfleet, Somerset, Secretary.

Rowan County Medical Society has elected the following officers: Dr. T. A. E. Evans, President; Dr. John Cavins, Vice-President; Dr. G. C. Nickell, Secretary-Treasurer.

Todd County Medical Society has elected the following officers: Dr. R. L. Boyd, President; Dr. B. E. Boone, Vice-President; Dr. W. E. Barlett, Secretary-Treasurer.

Whitley County Medical Society has elected the following officers: Dr. J. D. Adkins, President; Dr. Garfield Howard, Vice-President; Dr. C. A. Moss, Secretary-Treasurer.

Dr. John M. Williams has been elected President of the Health Board at Paris.

A health clinic will be established in Mercer County. The clinic will provide for the examination of babies, training classes for mothers on the care of children, and clinics for the mothers themselves. In addition there will be provision for the treatment of trachoma.

Dr. William Lipscomb, Lexington, has accepted a position with the Director of the Board of Sanitation of the Louisiana State Board of Health for the summer.

Dr. William Mason, Stamping Ground, has been appointed to succeed Dr. John E. Pack on the Scott County Health Board.

Dr. Arthur H. Keller has been re-elected City Health Officer of Paris and Secretary of the Board of Health.

Dr. R. T. Franklin, Calhoun, has accepted the superintendency of the hospital at Humboldt, Arizona.

Drs. Joseph E. Wells, Cynthiana, and James C. Mitchell, Louisville, have been appointed members of the State Board of Health.

Dr. E. B. Walker and Miss Geneva Wilson, both of Mayfield, were married June 15.

Dr. Urey Guess Davis and Miss Emma Cooke Pickering, both of Hopkinsville, were married June 14.

Deaths

Dr. Ambrose William Jones, Owingsville, aged 51, died June 8 at the Good Samaritan Hospital, following an operation.

Dr. William S. Taylor, Marrowbone, aged 63, died May 26.

Dr. Marshall E. Cooksey, Etoile, aged 82, died June 9 from tuberculosis.

Dr. Reese B. Kash, Frenchburg, aged 51, died May 17.

Dr. J. J. Cody, Codyville, aged 78, died June 5.

Dr. J. W. Gilmore, Elkton, died recently.

LOUISIANA

The state asylum for the insane, to be located in or near New Orleans, will be known as the Southern Psychopathic Hospital.

The Louisiana Anti-Tuberculsois League has elected the following officers: Dr. Ernest S. Lewis, New Orleans, President, reelected; Dr. Emil Leipziger, New Orleans, First Vice-President; Mrs. J. St. Clair Favrot, Baton Rouge, Second Vice-President; Sinclair Allison, New Orleans, Treasurer.

An eight story building will be erected opposite the Touro Infirmary, New Orleans, exclusively for physicians, at an approximate cost of $400,000. It is understood that at the end of ten years, physicians occupying offices in the building, will become permanent owners of the building.

The Presbyterian Hospital, New Orleans, announces that Dr. Henry Ladd Stickney, Dwight, Illinois, has been appointed Superintendent.

Dr. B. F. Gallant has purchased the St. Simeon's School, New Orleans, and it will be remodeled into a sanatorium.

At the annual meeting of the Medical Women's National Association in St. Louis, Dr. Elizabeth Bass, New Orleans, the retiring President, was appointed Delegate to the Medical Women's International Association which will meet in Geneva, Switzerland, in September.

The Louisiana Anti-Tuberculosis Association has purchased 348 acres of land at Greenwell Springs for a tuberculosis hospital. The league has pledged itself to raise the sum necessary to pay for the property.

Deaths

Dr. M. A. Taylor, Torras, aged 63, died May 21.

Dr. Allen J. Perkins, Lake Charles, aged 56, died June 20.

MARYLAND

The new medical and orthopedic dispensary, in connection with the Hebrew Hospital, has been completed. The dispensary is a gift to the hospital by Morton Samuels, and is known as the Hess Dispensary, in memory of Mrs. Samuels' parents.

Steps have been taken toward equipping all the wards of the Johns Hopkins Hospital with wireless, so that all kinds of music and other forms of entertainment may be given for the benefit of the patients.

Dr. Leon C. Havens, Baltimore, has been appointed Director of the Laboratory work of the State Health Department.

The following have been appointed County Health Officers: Dr. Harry M. Slade, Reistertown, Baltimore County; Dr. Lewis K. Woodward, Westminster, Carroll County; Dr. Henry P. Fahrney, Frederick, Frederick County; Dr. Norman S. Dudley, Church Hill, Queen Anne County.

Gifts totaling $50,000 from Mr. R. W. Kelley, New York, and Mr. Willis S. Kilmer, Remlik, Virginia, former patients at the James Buchanan Brady Urological Institute, Johns Hopkins Hospital, Baltimore, made possible the operation for the past year of the Kelley-Kilmer ward.

Dr. J. H. Mason Knox, Jr., Baltimore, has been appointed chief of the State Bureau of Maternity and Child Hygiene.

Dr. Edwin Louis Frederick and Miss Bertha D'Unger, both of Catonsville, were married June 7.

Dr. Henry Richmond Slack, Jr., Baltimore, and Miss Elizabeth Blanchard Randall, Catonsville, were married June 14.

Dr. Harry Eugene Wilson, Baltimore, and Miss Angelo Pauline Kehoe, were married June 24.

Dr. George Edward Webb Hardy, Catonsville, and Miss Minnie Gertrude Calary, Jarrettsville, were married June 10.

Dr. Bertha E. Tapman and Maurice E. Shamer, both of Baltimore, were married June 18.

Deaths

Dr. Winton Markwood Nihiser, Hagerstown, aged 63, died June 17.

Dr. Clarence Warfield, Baltimore, aged 56, died May 10.

MISSISSIPPI

Plans are being made for the construction of the $100,000 four-story charity hospital, Meridian. The hospital will be located in the center of a ten-acre lot within the grounds occupied by the East Mississippi Insane Hospital. Two-thirds of the cost of construction will be furnished by the City, and the balance by the County.

MISSOURI

Work on the new $1,000,000 hospital of the Sisters of St. Mary, St. Louis, has been started. It will be a seven story building and will accommodate 200 patients.

Dr. George Dock, Professor of Medicine, Washington University Medical School, St. Louis, has resigned.

The following have been appointed honorary members of the consulting staff for Hospital No. 2, St. Joseph, and will serve without pay: Dr. E. C. Renaud, Laryngology and Rhinology; Dr. M. J. Farber, Dermatology; Dr.

(Continued on page 38)

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(Continued from page 676)

Charles Greenberg, Genito-Urinary; Dr. Caryl Potter and Dr. H. K. Wallace, Surgeons; Dr. J. G. Morgan, Dental Surgeon; Dr. W. H. Minton, Ophthalmology; Dr. R. Disque, Otology; Dr. L. H. Fuson and Dr. C. A. Good, Internists; Dr. A. B. McGlothlan, X-Ray.

A new addition to the Amanda Hospital, Mexico, is being erected at a cost of $37,000.

The new hospital to be built as an addition to State Hospital No. 1, Fulton, will cost approximately $85,000, and will care for 120 patients.

Dr. George Dock, St. Louis, has been elected President of the American Society of Tropical Medicine.

The Midwest Training School of Kansas City has announced a special summer course of six weeks for the training of x-ray and laboratory technicians.

As a token of esteem, Dr. J. E. Jordan, Columbia, was recently presented with a gold watch by the Boone County Medical Society. Because of injuries received in an automobile accident last fall, Dr. Jordan is retiring from practice. Dr. William P. Fischer, Columbia, succeeds Dr. Jordan as Secretary of Boone County Medical Society.

The Liberty Hospital Building Company, St. Louis, will erect a new hospital on the southwest corner of Taylor and Washington Avenues.

Dr. J. W. Boger, Sedalia, has been appointed County Health Officer of Pettis County.

The St. Louis Medical Society has appointed a committee to investigate sites for the erection of a new building for the Society.

Dr. C. H. Wallace, St. Joseph, succeeds Dr. Daniel Morton as a member of the welfare board.

Dr. Paul Forrey Stookey, Kansas City, and Miss Clara Sachse, were married recently.

Deaths

Dr. Tyre H. Dinwiddie, Higbee, aged 63, died May 21 from cerebral hemorrhage.

Dr. John L. Kennard, Morrisville, aged 68, died May 17 at Fredonia, Kan., from cerebral hemorrhage.

Dr. Crawford Lester Hall, Kansas City, aged 76, died June 10 from cerebral hemorrhage.

Dr. Herman Tuholske, St. Louis, aged 74, died June 12 from chronic interstitial nephritis and hypostatic pneumonia.

Dr. Samuel T. Floyd, Kansas City, aged 81, died June 1.

(Continued on page 40)

Laboratories of

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ATLANTA, GEORGIA

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How Supplied: **LUMINAL:** Tablets, 1½ gr., bot. of 50; ¼ gr., bot. of 100; Powder, ½ oz.
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Send me full particulars re your special proposition as advertised in Southern Medical Journal.

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Enclose your letter head.

(Continued from page 38)

Dr. George W. Vernon, Dexter, aged 64, died June 5 from heart disease.

Dr. George Louis Schmitt, Kansas City, aged 46, died June 22.

Dr. William Bostick, St. Louis, aged 45, died June 17 at the Evangelical Deaconess Home and Hospital.

Dr. Sherman Mills, Macks Creek, aged 51, died suddenly early in May.

NORTH CAROLINA

The Southern Pediatric Seminar will be held at Saluda and Black Mountain for two weeks from July 31 to August 12, inclusive.

Dr. C. S. Lawrence has been elected President of the Lion's Club, recently organized in Winston-Salem.

The new French Broad Hospital, Asheville, was recently opened. The property was purchased as a cost of $30,000.

Dr. J. H. Epperson, Bacteriologist and Chief Inspector for the Board of Health, Durham, has been elected County Health Officer of Durham County, succeeding Dr. Archibald Cheatham, resigned.

A new community hospital will be erected at Drayton.

Typhoid and diphtheria prevention campaigns were recently carried out in various counties in the State. Three treatments of typhoid vaccine each were given to nearly 10,000 persons and as many treatments of toxin-antitoxin, for diphtheria prevention, to 884 children between the ages of six months and six years.

Dr. Karl Burkee Pace, Greenville, and Miss Lida Harrison Taylor, Goldsboro, were married June 7.

Dr. Willard Strickland, Wendell, and Miss Cleo Mariner, Pocomoke, Md., were married at Richmond May 10.
10.

Deaths

Dr. Franklin P. Gates, Manteo, aged 62, died May 20 at Norfolk, Va., from valvular heart disease.

Dr. Preston B. Loftin, Beaufort, aged 60, died May 10.

OKLAHOMA

Improvements have been made at the University of Oklahoma Medical School, Norman. An additional building was provided for the University Hospital at a cost of $75,000,

(Continued on page 42)

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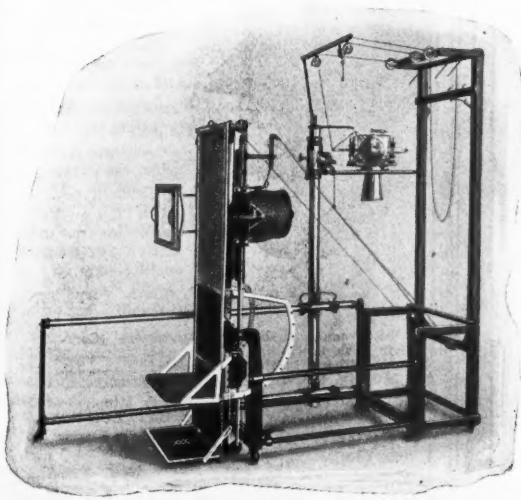

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(Continued from page 40)

increasing the capacity from 176 to 276 beds; a nurses' home was erected at a cost of $60,000. The legislature provided an appropriation of $20,000 for radium.

Dr. Andrew J. Smith has been appointed City and County Health Officer of Pawhuska, succeeding Dr. George W. Goss.

Drs. Hinson and Boyle, Enid, announce the dissolution of their partnership.

Dr. Cary W. Townsend, Oklahoma City, has been appointed City Physician to succeed Dr. J. T. Martin.

Drs. F. B. and W. P. Fite, Muskogee, are planning to erect a private hospital.

Physicians of Oklahoma City have been granted exemption from certain traffic regulations, which will permit them to park in restricted zones.

Deaths

Dr. Nelson Stiles, Medford, aged 65, died at Wichita, Kansas, from heart disease.

Dr. Frank S. Sturdevant, Vanoss, aged 60, died May 25.

SOUTH CAROLINA

The Fifth District Medical Society, composed of the counties of Chester, Fairfield, Kershaw, Lancaster and York, has elected the following officers: Dr. W. R. Wallace, President; Dr. G. W. Poovey, Dr. W. M. Love, Vice-Presidents; Dr. G. A. Hennies, Secretary-Treasurer.

Deaths

Dr. Walter C. Hemingway, Hemingway, aged 46, died June 3, from burns received as a result of a gasoline explosion when sterilizing some surgical instruments.

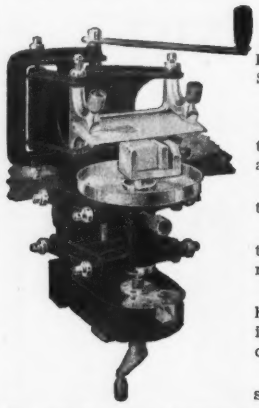
Dr. David L. Donald, Williamston, died recently following an attack of apoplexy.

TENNESSEE

The West Tennessee Medical and Surgical Association has elected the following officers: Dr. R. L. Greer, Norwood, President; Dr. L. J. Lindsley, Covington, and Dr. B. S.

(Continued on page 44)

SPENCER CLINICAL MICROTOME



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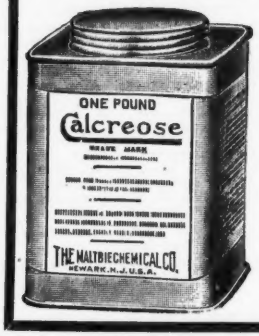
N. N. R. says, speaking of creosote and guaiacol compounds:

*** * * are used internally as intestinal and urinary antiseptics, as stimulant expectorants in bronchitis and in the treatment of tuberculosis.**—N.N.R., p. 91.



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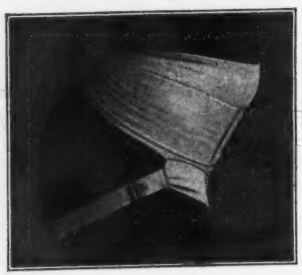

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(Continued from page 42)

Penn, Humboldt, Vice-Presidents; Dr. I. A. McSwain, Paris, Secretary-Treasurer. One of the features of the meeting held May 16-17 was the presentation of a loving cup to Dr. I. A. McSwain by Dr. Frank Smythe, Memphis, on behalf of the Association, in recognition of the long and efficient services rendered by Dr. McSwain in making the Association one of the best sectional societies in the State. The 1923 meeting will be held in Dyersburg.

The Upper Cumberland Medical Society at its annual meeting elected the following officers: Dr. W. A. Howard, Cookeville, President; Drs. R. C. Gaw, Gainesboro, Dr. T. L. Lewis, Sparta, and Dr. J. J. McFarland, Lebanon, Vice-Presidents; Dr. Z. L. Shipley, Cookeville, Secretary; Dr. R. E. Lee Smith, Knoxville, Treasurer.

Grundy County Medical Society has elected the following officers: Dr. U. B. Bowden, Pelham, President; Dr. W. P. Stone, Tracy City, Vice-President; Dr. W. A. Jackson, Monteagle, Secretary-Treasurer.

Jefferson County Medical Society has elected the following officers: Dr. H. L. Campbell, Strawberry Plains, President; Dr. B. E. Olive, Strawberry Plains, Vice-President; Dr. T. A. Caldwell, Dandridge, Secretary-Treasurer.

The Southern Railway Surgeons met in Chattanooga the last week in June. The following officers were elected: Dr. W. M. Cunningham, Corona, Ala., President; Dr. Edward T. Newell, Chattanooga, Dr. W. W. McKenzie, Salisbury, N. C., Dr. S. C. Meigs, Centerville, Ala., and Dr. W. E. Gallion, Oakdale, Vice-President; Edith A. Foltz, Washington, D. C., Secretary-Treasurer. A ladies auxiliary was formed at this meeting. The following officers were elected: Mrs. W. W. Vaught, Shouns, President; Mrs. Lucille Boynton, Sparta, Ill., Secretary-Treasurer; Mrs. W. A. Applegate, Washington, D. C., Mrs. R. W. Thompson, Lumberton, Miss., Mrs. W. A. Monroe, Sanford, S. C., Mrs. E. C. Seawright, Fayetteville, N. C., Executive Committee.

Dr. C. Emerson Duvall, Memphis, was recently reelected President of the South Side Business Men's Club.

Dr. C. P. M. Sheffey, Virginia, has been appointed medical missionary to Africa by the Epworth League of the M. E. Church, South.

The Marine Hospital, Memphis, will be returned to the Public Health Service by the Veterans' Bureau as soon as the latter takes over actual control of the Methodist Hospital. Maj. James Brew, for three years in charge of the Marine Hospital, will take charge of the Methodist Hospital for the Veterans' Bureau.

Dr. Willis C. Campbell and Dr. Marcus Haase, Memphis, were elected Chairman of the Section on Orthopedic Surgery, and Chairman of the Section on Dermatology and Syphilology, respectively, of the American Medical Association, at its meeting in St. Louis.

Dr. J. J. Gee, Chattanooga, has been appointed medical examiner for the United States Marine Corps, and for examination of recruits at the United States Marine Corps Recruiting Station.

Deaths

Dr. Kenneth L. Jones, Lewisburg, aged 32, was struck and killed by lightning, June 12.

Dr. Benjamin Franklin Abernathy, Danville, aged 72, died recently from influenza and pneumonia.

(Continued on page 46)

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RESIDENT PHYSICIAN WANTED for 40 bed tuberculosis sanatorium in Northern Louisiana. Knowledge of routine laboratory work and x-ray desirable. Write fully first letter, stating experience, age and salary expected. Address T B Sanatorium, care Southern Medical Journal.

ASSISTANT WANTED—Wanted, physician with experience in general practice to do office, x-ray and laboratory work in Virginia, small town. Will arrange all training needed. Moderate salary, which will begin on start. Prefer a man who cannot get about or who does not like general practice. Send recommendations with first letter. Address K. B., care of this Journal.

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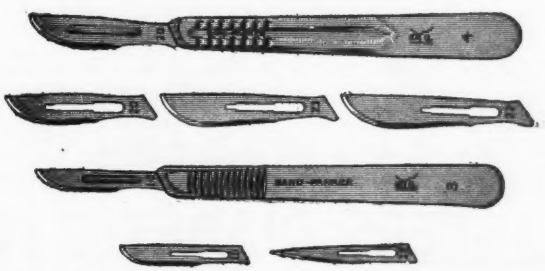

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BIRMINGHAM, ALABAMA

(Continued from page 44)

Dr. Allen M. Riggs, Lafollette, aged 55, died April 5.
Dr. J. C. Franklin, Nashville, died June 17.
Dr. H. C. Rose, Dayton, aged 72, died suddenly July 4.
Dr. J. John Carson Moore, Jearoldstown, aged 36, died at the Greenville Hospital and Sanitarium, Greenville, recently, where he had been under treatment for several weeks.
Dr. Caswell A. Atkins, Powder Springs, aged 70, died June 13.

TEXAS

It has been announced that the University of Texas, Galveston, will erect a fireproof building for library and museum purposes at an approximate cost of $150,000, together with the construction of a frame building for laboratories at a cost of $12,500, and a central heating plant.

The annual meeting of the Woman's Auxiliary of the State Medical Association was held in El Paso May 10. The following officers were elected: Mrs. M. L. Graves, Galveston, President; Mrs. W. A. Wood, Waco, President-Elect; Mrs. A. C. Scott, Temple, Mrs. R. B. Homan, El Paso; Mrs. S. E. Hudson, Austin, Vice-Presidents; Mrs. J. D. Covert, Fort Worth, Recording Secretary; Mrs. Boyd Reading, Galveston, Corresponding Secretary; Mrs. E. V. DePew, San Antonio, Treasurer.

Dr. Chas. C. Gault, member of the faculty of the University of Minnesota, has been appointed to the Chair of Physiology during Dr. Carter's absence, who has gone to the University of the Philippines and upon Dr. Carter's return, Dr. Gault will teach under his directions.

The Medical Department of the University of Texas has created a department of Pharmacology, Mr. Harry V. Atkinson, instructor in Pharmacology, Materia Medica and Toxicology in the College of Medicine, Universtiy of Illinois, has been appointed Associate Professor of this department.

Two new laboratories, physiology and pharmacology, separate buildings, have been erected at the University of Texas, Galveston, at an approximate cost of $19,000.

The new $125,000 West Texas Hospital, Lubbock, was recently opened.

Contracts have been awarded for the construction of the Medical Arts Building, Dallas. The building will cost approximately $1,000,000.

Dr. George W. Wilhite, Orange, has accepted an appointment at St. Luke's Hospital, Manila, P. I.

The Baptist Hospital, formerly known as the Protestant Hospital, Fort Worth, was recently opened.

Dr. Curtice Mack Rosser, Dallas, and Miss Mary Loy McGregor, Temple, were married recently.

Dr. Samuel Gibbs Milliken and Miss Harriet Elizabeth Bain, both of Galveston, were married June 24.

Deaths

Dr. Henry C. Morris, Brownwood, aged 68, died January 31 from apoplexy.
Dr. Milton William McMurrey, Houston, aged 38, died May 23.
Dr. William Lowry, Teague, aged 87, died May 20 from senility.
Dr. Henry Calhoun Fleming, Denison, aged 69, died at Henderson, Ky., April 26 from dilatation of the heart.
Dr. John H. Stuckey, Rosenberg, aged 49, died May 12 at Sanatorium, from tuberculosis.
Dr. Emmett James Hinton, Wrightsboro, aged 40, died May 13 from chronic nephritis.
Dr. Marshall Marion Chandler, Greenville, died July 8.

VIRGINIA

Hill Top Sanatorium, Danville, was formally opened June 4. The building has a capacity of thirty-four patients.

A new wing for orthopedic work, to be erected at a cost of $60,000, will be added to the University of Virginia Hospital.

Alumni of the Medical College of Virginia, residing in Norfolk, Berkley, Portsmouth, Suffolk, and surrounding territory, at their recent meeting decided to hold meetings semi-annually, in May and November. The following officers were elected: Dr. E. C. S. Taliaferro, Norfolk, President; Dr. Jos. D. Collins (medical), Portsmouth, Dr. D. A. Dudley (dental), and Marcellus Miller (pharmacal), Vice-Presidents; Dr. W. M. Chandler, Secretary.

Dr. William Armistead Gills, who has been attached to the United States Naval Station at Guam, has been ordered to his home in Richmond.

Dr. Carrie Chase Davis, Hopewell, has accepted a posi-

(Continued on page 48)

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Get our price list and discounts on quantities before you purchase
HUNDREDS OF DOCTORS FIND WE SAVE THEM FROM 10% TO 25% ON X-RAY LABORATORY COSTS.
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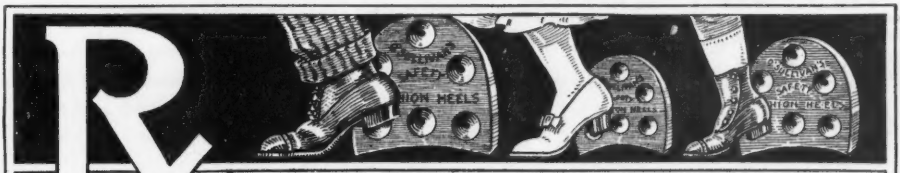

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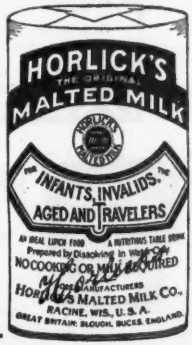

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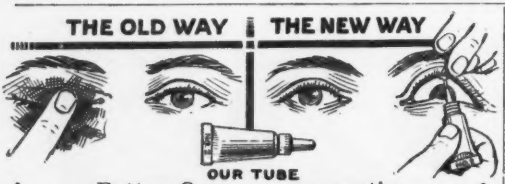

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(Continued from page 46)

tion at the Southeastern State Hospital, North Madison, Ind.

The American Proctologic Society has elected Dr. E. H. Terrell, Richmond, President.

Dr. Mary E. Brydon, of the State Board of Health, has been appointed as one of the commissioners at large to investigate the feasibility of establishing separate schools for the deaf and blind.

Dr. William C. Powell, Petersburg, has been appointed Brigade Surgeon of the Second Brigade, Sons of Confederate Veterans.

Dr. W. D. Prince, Stony Creek, was elected Vice-President of the Sussex County Medical Society instead of Dr. J. F. Slade, as given in our July issue.

Work has been started on the King's Mountain Memorial Hospital, Bristol. It will have a sixty-bed capacity and will cost approximately $150,000.

Dr. Clifton M. Miller, Richmond, has been elected a member of the American Otological Society.

Dr. Loren E. Cockrell, Reedville, has been elected a member of the Board of Directors of the Northumberland Chamber of Commerce.

The Old Dominion Medical Society has elected Dr. G. Hamilton Francis, Norfolk, President; Dr. A. B. Green, Berkley, Treasurer; Dr. J. A. Q. Webb, member of the program committee.

The Virginia Graduate Nurses' Association has elected the following officers: Miss L. L. Odom, Sarah Leigh Hospital, Norfolk, President; Miss Bettie Wingfield, Bristol, and Miss Florence Bishop, Portsmouth, Vice-Presidents; Miss Heard, Richmond, Secretary; Miss Margaret Cowling, University, Treasurer.

The South Piedmont Medical Society has elected Dr. Geo. B. Barrow, Clarksville, President; Drs. J. B. Lacy, Nathalie, R. P. Kelly, Lynchburg, J. J. Neal, Danville, Ray A. Moore, Phenix, Vice-Presidents; Dr. Geo. A. Stover, South Boston, reelected Secretary-Treasurer.

The Medical Society of Virginia, Maryland and District of Columbia has elected Dr. William L. Lewis, Kensington, Md., President; Drs. J. H. Ferguson, Clifton Station, and E. J. Horgan, Washington, D. C., Vice-Presidents; Dr. Wm. T. Davis, Washington, D. C., Recording Secretary; Dr. Joseph D. Rogers, Washington, D. C., Corresponding Secretary; Dr. Robert Scott Lamb, Washington, D. C., Treasurer.

Dr. John Terrell Scott, Lynchburg, and Miss Vivian White, Denver, were married June 14.

Dr. Robert Graham Wiatt, University, and Miss Marian C. Myers, Charlottesville, were married May 5.

Deaths

Dr. Reuben Lindsay Robertson, Charlottesville, aged 62, died June 4 at University Hospital from septic pleurisy.

Dr. Thaddeus N. Kabler, Bedford Springs, aged 94, died April 28 following fracture of the femur.

Dr. Hugh McGuire Taylor, Richmond, aged 66, died May 30 at his country home in Westhampton.

Dr. William Logan Dunn, Glade Springs, aged 83, died June 26.

WEST VIRGINIA

Deaths

Dr. Waldo Percy Goff, Clarksburg, aged 52, died suddenly recently.

Dr. Overton Leonidas Baker, Ronceverte, aged 60, died May 11 from uremia and chronic nephritis.

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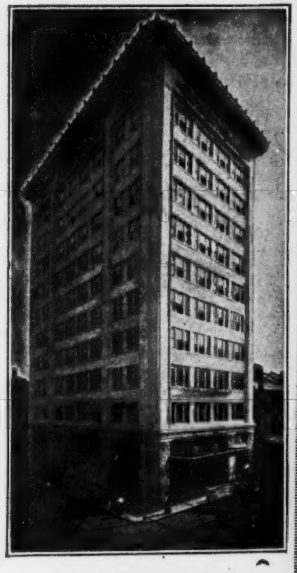

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